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PRELIMINARY REPORT ON THE LEONARD ROCKSHELTER SITE PERSHING COUNTY, NEVADA*

ROBERT F. HEIZER

IN SEPTEMBER, 1949, while in west central Nevada for the purpose of collecting vegetal materials from the lowermost cultural levels of Lovelock cave (Loud and Harrington, 1929) to be used for radiocarbon dating, the author revisited an open rockshelter site some six miles up the valley from Lovelock cave. The site, since named Leonard rockshelter (site 26-Pe-14) after Zenas Leonard who in 1833 traversed the Humbolt Sink area as a member of the Walker expedition (Leonard, 1904), is not referred to by Loud and Harrington. It is the same site from which, in 1936, Thomas Derby mined bat guano and recovered artifacts described in a brief article (Heizer, 1938). The bat guano formed a layer two to three feet thick lying on ancient gravels of Lake Lahontan and beneath a thick accumulation of aeolian dust and rockfall. Derby's artifacts came from the deep guano layer, a fact checked in the summer of 1937 by a University of California field party which spent two days at the site and during minor excavation recovered additional wooden artifacts from the same layer. In 1949 a sample of several pounds of dry, unburned bat guano were collected from what we determined as the approximate level at which the wooden artifacts had been recovered in 1937 and 1936. This guano was sent to W. F. Libby at the Institute for Nuclear Studies, and we received two radiocarbon dates of 8443 ± 510 and 8820 ± 400 years old for the sample (Arnold and Libby, 1950, p. 10, sample 281). This dating seemed rather old for the type of cultural materials, so we dispatched to Libby three fragmentary greasewood atlatl foreshafts from the same deposit and received for them a radiocarbon date of 7038 ± 350 years (Arnold and Libby, 1950, pp. 10-11, sample 298). From the average of the guano (sample 281) of 8660 ± 300 years B.P. (6710 B.C.) and of the atlatl foreshafts from the same layer of 7038 ± 350 years (5088 B.C.), it appeared that we had discovered a site which fell into the category of early man. In Lovelock cave a thin sterile layer of bat guano lay directly upon the lacustrine sediments and directly beneath the lowermost culture refuse (Loud and Harrington, 1929, p. 120). Two samples of this guano were sent to Libby, the age of one (sample 277) being 4448 ± 250 years (2500 B.C.) and of the other (sample 278) 6046 ± 300 and 5961 ± 400 years (average, 6004 ± 250 years old or 4054 B.C.). The deepest, and therefore presumably oldest, occupation refuse (sample 276) collected from under a tremendous rock which had blocked the cave entrance was determined as 2452 ± 280 and 2517 ± 320 years old (532 B.C.).

Permission to excavate Leonard rockshelter was secured from the Southern Pacific Railroad and the Department of Interior, and the University of California Summer Session class

* For the success of the 1950 Nevada excavations, the University of California is indebted to the following: J. R. Arnold and W. F. Libby of the Institute for Nuclear Studies, University of Chicago, for radiocarbon analyses; L. Fransden, Land Commissioner of the Southern Pacific Railroad. Jesse L. Nusbaum of the National Park Service; G. Momberg, manager of Lovelock Properties Inc. (formerly the Nevada-Nile Corp.); and to the members of the crew—Clara Stern, James Robson, Gordon Grosscup, Cherie Gregoire, Mary Elizabeth Hall, Martin Baumhoff, Norman Roust, Albert Elsasser, Winifred Hawxhurst, John Costa, Arnold Pilling (Assistant), Thomas Bolt and Harry Millman. We are particularly indebted to Ernst Antevs for helping us interpret stratigraphy and for research on Lake Lahontan shoreline features in the Humboldt basin. He has read and commented on this paper, an assistance which the author gratefully acknowledges. Antevs should not be held responsible for any faulty statements or interpretations contained herein.

in archaeology excavated the site between June 20 and July 28, 1950. The 1950 work represents a continuation of the sporadic interest in Nevada by the University which supported Loud's excavations at Lovelock cave in 1912 and 1924 (Loud and Harrington, 1929), the excavation of Humboldt cave in 1936 (Heizer and Krieger, n.d.), and the ethnographic surveys of Omer Stewart (1941) and Julian Steward (1938, 1941).

The area of investigation was the lower end of the Humboldt Valley, through which the Humboldt River meanders to find its end in Humboldt Lake or, as it was earlier named, the sink of the Humboldt. Humboldt is one of the several remnants of the ancient Lake Lahontan system (Russell, 1885, pp. 40-1, 66-8; Meinzer, 1922), and though now extinct, was until recently a small, shallow body of water surrounded by tule marshes. Its water, though somewhat alkaline, supported both fish and mollusks and was sufficiently pure for human use. In this arid region the river and lake must have been an extremely attractive living area by reason of the availability of food and water. The rockshelter site is located in the protection of a vertical extrusive rock dyke whose main axis is approximately east-west and which runs diagonally down the lower slope of the Humboldt Range about 17 miles due south of the town of Lovelock, Nevada, and near the northeast end of the Humboldt

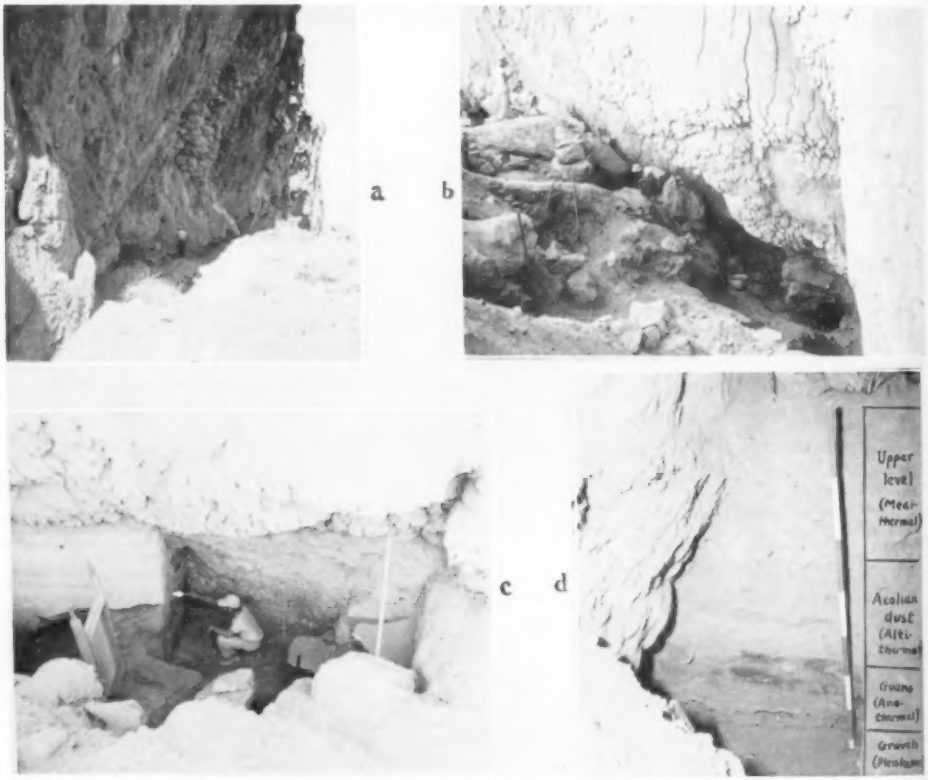

FIG. 39. Leonard rockshelter site. *a*, north face of cliff showing protective overhang and tufa draperies; *b*, area D excavations showing fallen rock in deposits and cutting back of cliff walls; *c*, area C excavation. Man kneeling on Pleistocene gravels points to level of twined basketry and infant skeleton in lowest part of windblown dust layer of the Altithermal dry age. Dark layer beneath trowel is burned guano of Anathermal period; *d*, vertical profile in area B showing stratigraphic divisions.

Lake basin along the very lowermost course of the river. The north face of the cliff is so tilted outward at the top that the area at the base of the cliff is kept completely dry (Fig. 39, *a*). This situation has apparently obtained for the past 10,000 years. The north face of the cliff is heavily encrusted with calcareous tufa draperies deposited during the Provo Pluvial stage of Lake Lahontan by algae colonies (Jones, 1925, pp. 19ff.). This tufa crust has peeled off in some areas and dropped huge sheets of material within the rockshelter area thus preventing effective archaeology. Our work was mainly in those restricted portions where the tufa was still affixed to the cliff face and the deposits beneath were diggable (Fig. 39, *b*). Although the north cliff face base runs for about 400 feet, we found only four small areas which offered any promise of being free enough to enable excavation to be carried to the bottom of the deposits. These four spots we designated as areas A, B, C, and D. Area A was unproductive and shallow; area B was rewarding in that the deep guano level was intact and produced artifacts; area C (Fig. 39, *c*) yielded an infant burial, though the deep guano layer was burned; area D (Fig. 39, *b*) had been badly disturbed by pothunters and guano miners, and was chiefly significant in producing cultural materials from the top levels, though the bottom guano deposit, while burned, also yielded an artifact.

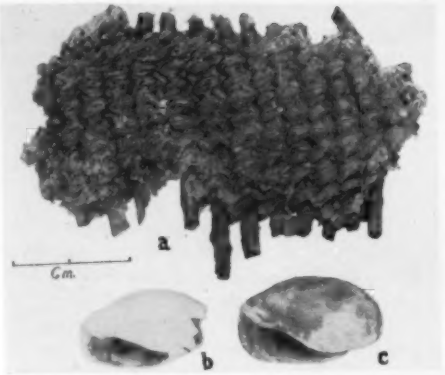

FIG. 41. Leonard rockshelter artifacts. *a*, carbonized stiff twined basketry associated with infant burial in area C, Leonard culture; *b*, *c*, *Olivella biblicata* shell beads from deep guano layer in area B, Humboldt culture.

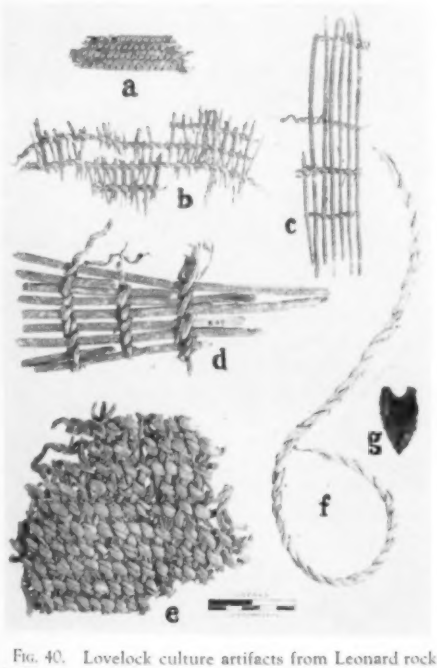

FIG. 40. Lovelock culture artifacts from Leonard rockshelter. *a*, coiled basketry fragment; *b-d*, openwork stiff twined carrying basket fragments; *e*, twined tule matting; *f*, left twist sedge rope; *g*, obsidian projectile point, length 3.0 cm., weight 2 grams. All other objects to scale shown.

Since the final report on the site will present the details of the stratification, it is sufficient here to generalize these data by pointing out that the uppermost two feet consisted of windblown dirt, packrat nest material in the form of sticks and stones, and scalings from those portions of the cliff face above which had been freed of its tufa covering. The upper stratum comprised all of the deposit in area A, was present in areas B and C but did not produce artifacts, and in area D, notwithstanding its partial disturbance, yielded numerous artifacts (mostly basketry and wood) which are identical to those from Lovelock and Humboldt caves. These types include pieces of cordage nets (for fish, rabbits or ducks); 3-rod foundation coiled basketry with split-stitches on one surface (Fig. 40, *a*); coarse twined tule (*Scirpus*) matting (Fig. 40, *e*); several varieties of coarse rigid openwork twine basketry (Fig. 40, *b-d*) which are fragments of carrying baskets; a small obsidian arrowpoint

(Fig. 40, *g*); greasewood arrow foreshafts and fragments of cane (*Phragmites*) arrowshafts. No seed grinding tools were found, though remnants of food (dessicated fish, *Pinus monophylla* shells) occurred. None of the wicker basketry, so distinctive and peculiar to the area, was found in the upper level of the area D deposits, and we attribute this to chance. Our impressions were that the shelter was used in recent times as a temporary retreat, perhaps from enemies or in periods of intense cold when protection from wind and snow would be offered by the overhanging cliff face. The next lower, or intermediate, stratum consisted of fine windblown dust plus some tufa rockfall; it averaged about two and a half feet in thickness, and only in area C did it produce artifacts. The area C find was a considerable quantity of carbonized stiff close twined basketry (Fig. 41, *a*). The basketry warps are peeled willow (?) rods 3 mm. in diameter; the wefts are apparently pliable splints of the same material. The pitch of the stitches is upward toward the right, and there are 8 wefts per inch and 4 warps per inch. This is not Catlow Twine, and there is nothing quite similar to it in any of the material at Berkeley from Lovelock or Humboldt caves. This is not to say that the basketry is unusual or particularly distinctive *per se*, but only to observe that for the Lovelock region it is not duplicated by other finds. About a pound of crushed carbonized warp and weft fragments of this basketry were salvaged with a window screen and sent to Libby for a radiocarbon date. The radiocarbon determination of this material (sample 554) was 2736 ± 500 years (786 B.C.). Antevs, who spent two weeks in the field with us, was of the opinion that the intermediate layer of fine material was probably ascribable to the dry period of the postglacial, the period for which he (Antevs, 1948, p. 9) suggests a duration of 5000 B.C. to 2500 B.C. and names the Altithermal. He recently suggests that the dry age of the Middle Postglacial could be named the "Long Drought" when primary reference was to moisture rather than temperature conditions (personal communication). The radiocarbon date, then, seemed too recent to harmonize with the stratigraphy, and I therefore requested Libby to re-run the sample, a favor which he most kindly granted. On the basis of the re-determination he submitted two dates of 5779 ± 400 and 5694 ± 325 years old (3786 B.C.). This date was much more acceptable, and Libby accounts for the error of the first determination (published in Arnold and Libby, 1950, p. 11) as due either to error in identification or to incomplete washing of the sample before its analysis. The basketry, together with a few fragments of carbonized two-ply right-twist fiber cordage, lay scattered about over an area of about 20 square feet. Some pieces were in direct contact with the underside of some bucket-sized tufa chunks, as though the rocks had been thrown in upon the basketry as it lay on the surface. This looked suspicious, and we were therefore not too surprised to discover on one edge of the burned basketry area a burial, that of a newborn infant in the foetal position. One may observe that a skeleton of an adult male of this antiquity would be of considerable interest, but it is the luck of the archaeologist to discover instead some miserable newborn infant which was too weak to withstand the heat and rigors of the Altithermal. At any rate, the skeleton is human, and it was buried there within 400 years one way or the other of the date of 3786 B.C. At least the basketry is interesting!

The third, and lowermost, level consisted of about 3 feet of clean, solid bat guano of dark brown color and taste except where, in area C and part of area D, it had been burned. The burning, itself, probably indicates the presence of man whose campfires ignited the dry guano bed. From the area B guano layer we recovered a tan flint blade (Fig. 42, *e*), two *Olivella biplicata* shells with rubbed or broken off spires to enable the shells to be strung as beads (Fig. 41, *b*, *c*), and portions of cordage nets. Derby, as related above, had recovered some artifacts from this area; these include a complete atlatl dart (Fig. 42, *a*, *b*) measuring 130 cm. in length with cane shaft, long greasewood foreshaft with simple tip, and two tangential feathers. The dart is light (38.5 grams) and is decorated with a red-painted spiral sinew seizing at the cupped end. In addition, Derby recovered a complete greasewood atlatl foreshaft with a buckskin wrap at the large end (Fig. 42, *f*), and a string of about 50 *Olivella biplicata* shell beads. These finds have been fully described elsewhere (Heizer, 1938). In 1937, also as mentioned before, the University of California checked Derby's findings and recovered from the lower guano layer three

additional greasewood foreshafts (which constituted Libby's sample 298) and a fragment of a chipped obsidian blade. From the burned guano of area C which was carefully screened, we recovered only a small retouched obsidian flake (Fig. 42, *d*); any wooden objects which might have been present would have become completely ashed by the burning. Area D guano yielded only a thin obsidian flake (Fig. 42, *c*) from the deep guano layer—nothing else. There can be no question of the presence of man during the period the bat guano was being laid down. There is no clear indication that at this early period man lived continuously in the shelter, for no refuse deposit or hearths were noted. Occasional visits to the shelter and minor activities performed while there could account for the obsidian flakes. The other artifacts can best be explained as having been originally burial accompaniments, and although we looked for this hypothetical burial, we did not find it. There does seem an excellent chance that an adult burial lies somewhere in the undug block of area B deposits, or perhaps on its periphery. The artifacts could be explained as being due to scattering as a result of a coyote digging up a burial and eating it, though in this event some gnawed human bones should have been in evidence. At any rate, the dating of the wooden artifacts from area B is 5088 ± 350 B.C., and this indicates the bat guano layer as having been laid down during the relatively humid Anathermal period of the postglacial (Antevs,

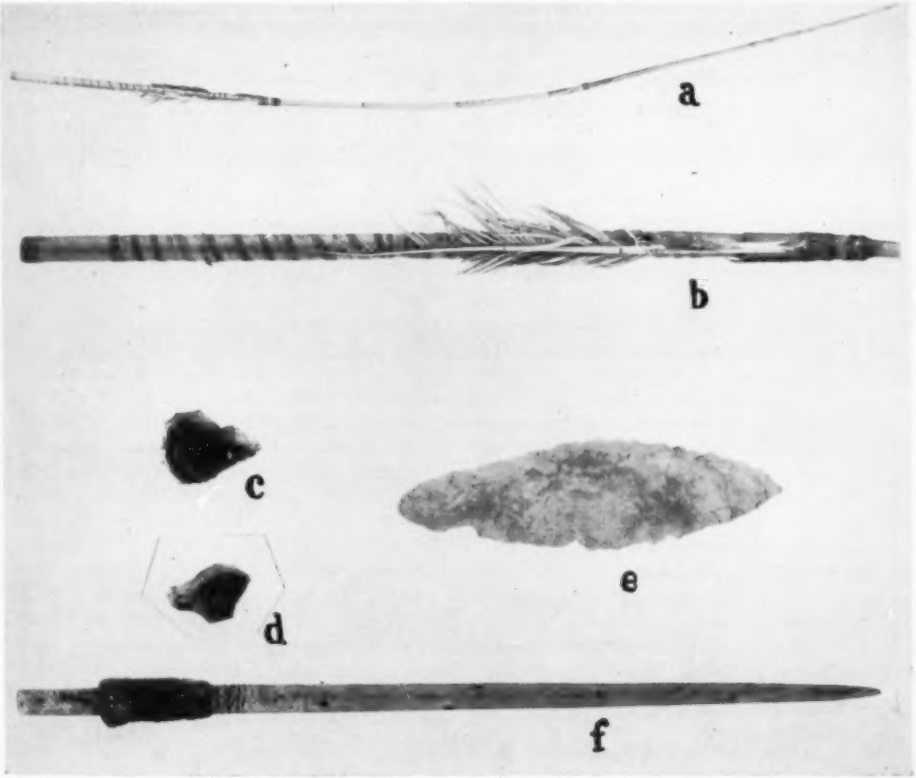

FIG. 42. Humboldt culture artifacts from deep guano layer in Leonard rockshelter. *a*, complete atlatl dart, length 130 cm. weight 38.5 grams; *b*, end of dart shaft showing tangential feathering and red-stained sinew spiral wrap; *c*, *d*, obsidian flakes from deep guano layer in areas C and D; *e*, flint blade from guano layer in area B, length 12.0 cm., weight 28.5 grams; *f*, greasewood foreshaft with leather wrapping, length 26.8 cm., weight 9 grams.

1948, p. 9). The bat guano was being laid down 8660 ± 300 years ago, and its deposition was largely concluded by the time the infant burial was laid down in area C some 5736 ± 375 years ago. When the bat guano began to be deposited upon the beach gravels beneath is conjectural, but a date of some 10,000 years ago does not seem excessive.[1] Since the two obsidian flakes from the guano level in areas C and D came from the very bottom of this level, they may be the oldest artifacts from the site with an antiquity approaching 10,000 years. This point should not be pressed until we receive a radiocarbon date for the deepest, and earliest, bat guano. The *Olivella* shell beads are of high interest, since they could have come only from the California coast, some 250 air-line miles west across the forbidding Sierra Nevada mountains. Unless we are to believe that the earliest inhabitants of Leonard rockshelter themselves visited the California coast and brought back shell beads, a proposition which I rank only as a hypothetical possibility, we may propose that the occurrence of these beads in west central Nevada indicates the presence of man on the California coast at this date, as well as the existence of groups in the intervening area who passed these items on to the east by way of intertribal trade.

Although strictly aside from the subject of the Leonard rockshelter site, it is important that mention be made of the discovery, in 1950, of a stone tool complex characterized by heavy flake scrapers and hemispherical scraper planes made of dense black basalt. This tool complex was noted as found throughout the lower Humboldt Valley lying upon or above a beach line at 3950 feet above sea level. The 3950 foot lake level, according to information received from Roger Morrison of the United States Geological Survey, who has been working on the Pleistocene history of the Carson Sink area a few miles south, is attributable to the period which Antevs calls the Anathermal. In our work we have followed Antevs' suggestion that the advent of the Anathermal Age some 9000 years ago (7000 B.C.) marks the end of the Pleistocene and the beginning of the Postglacial or Neothermal period. Krieger (1950, pp. 118-9; 1951, p. 358) alternatively proposes that the *end* of the Anathermal Age should be taken as marking the termination of the Pleistocene. Morrison's conclusion verifies Antevs' suggestion, made in the field, that this was the Anathermal strand line. This stone tool aggregate, then, is roughly contemporaneous with the cultural material from the deep guano level at Leonard rockshelter.

The analysis of the materials recovered in 1950 is sufficiently advanced so that we are prepared to assign culture names to some of the complexes which we recognize as distinct in type and time (see Fig. 43). The later culture series exhibited in Lovelock cave, Humboldt cave, in the uppermost levels of Leonard rockshelter and in the surface archaeology of Humboldt lakebed (Loud and Harrington, 1929, Appendix 1) we propose to call the *Lovelock Culture*. The Lovelock culture begins, at least in the type site of Lovelock cave, about 532 B.C., and the occupation of the area continues up to the present time with the historic Northern Paiute (Stewart, 1939). I think it perfectly possible that the earliest occupants of Lovelock and Humboldt caves were the ancestors of the Northern Paiute, even though the distinctive archaeological wicker basketry and some other late prehistoric items are unknown to recent Indians. Lovelock cave was unoccupied in the early historic period, as evidenced by the sterile bat guano layer covering the refuse deposits and by the testimony of local Indians (Loud and Harrington, 1929, pp. 1-3, 34, 165-9). This portion of the Great Basin may not have been so isolated and remote as we are often inclined to believe, and the seepage of new techniques and ideas into this region in some quantity and strength is certainly suggested as possible by the considerable evidence on hand for long-distance trade by these people. For example, we have a number of Dentalium shells from the Lovelock sites which could have come only from the Southern British Columbia coast; many *Olivella* bead types and abalone (*Haliotis*) shell ornaments whose origin is certainly the Central California coast; a single tubular bead of *Tivela stultorum* (Pismo clam) which certainly hails from the Santa Barbara region; and numerous pieces of beautifully made coiled basketry fragments with feather decorations. These last are so distinctive in technique and decoration that we look

[1] Since this was written, Libby has determined the age, by the radiocarbon method, of the bat guano lying *immediately upon* the late gravels at Leonard rockshelter. The date is 11199 ± 570 years (9249 B.C.).

to the Central California region for their source. The antiquity of wide ranging trade we have already mentioned as a possibility in connection with the *Olivella* shells from Leonard rockshelter. See also the interesting remarks by Fremont in 1844 at Pyramid Lake concerning Indian knowledge of California (Fremont, 1845, p. 219). The question of Californian and Great Basin culture connections is specifically treated by Kroeber (1925, pp. 915-17) and Lowie (1923).

The carbonized twined basketry and the baby skeleton (one wonders where its mother and father lie buried) from area C of Leonard rockshelter and dating from 3786 B.C. is our only clear evidence (there is a lot of additional but unclear "evidence") for the occupation of the Humboldt Sink area in the dry Altithermal period. Because of the difference in the dating of this find between that of the earlier Humboldt and later Lovelock cultures, we venture to assign to it a separate name, the *Leonard Culture*. The first clear evidence of men hardy enough to withstand the Middle Postglacial "Long Drought" is, by itself, almost sufficient reason to signalize it by name (cf. Antevs, 1948, p. 16).

Still earlier in time we have the cultural material from the deep guano layer at Leonard rockshelter (the atlatl parts, chipped blade, *Olivella* beads, and obsidian flakes), and this complex we propose to name the *Humboldt Culture*. It dates from the somewhat wetter Anathermal period when the Basin lakes were higher, and it is also from this period that the basalt core and heavy flake tools from the local 3950 foot strand line derive. This lithic complex we propose to name the *Granite Point Culture*. So far as we know, it is approximately contemporaneous with the Humboldt culture material, but since it differs both in type and location, the two are likely to appear as distinct cultures even though they may actually only represent open and closed site phases of the same culture complex. I know no way of deciding this problem with the evidence at hand, and therefore take the bit in my teeth and give it independent rank. The Humboldt culture, at least, was operating around 5000 and 6000 B.C. when we know the lake levels were higher than at present, or for that matter, at any time since Anathermal times.

The chronological chart presented in Fig. 43 represents our ideas in the light of present evidence. The relative sequence is certainly defensible, since it rests upon radiocarbon dates. We suspect that we have pre-Anathermal man evidenced, but do not know for certain.[2] The ending of the Granite Point-Humboldt culture period is arbitrarily placed at about 4500 B.C. for two reasons. First, the artifacts dated 5088 B.C. lie in the guano level with guano deposit over them which indicates that the climatic conditions (i.e. of the Anathermal) persisted for a time; and second, the date of 3786 B.C. for the carbonized basketry in area C is such stratigraphically that it marks a time early in the Long Drought of the middle Postglacial. This may appear to give the Granite Point-Humboldt culture period an unreasonably long duration, but dates are dates. Antevs' threefold division of the Postglacial or Neothermal is based upon temperature and its fluctuations (Antevs, 1948). Temperature was employed for this purpose in order to get correlations, for dating, over the mid-latitudes of the northern hemisphere. Moisture conditions, to which lake levels and surface water supply are directly linked, depend upon regional conditions. Temperature and moisture may vary independently, and the dates of the beginning and ending of the middle Postglacial Long Drought are not necessarily identical with those of the start and finish of the Altithermal age of higher temperature. Our radiocarbon date of 3786 B.C. (sample 554) based on artifact materials whose stratigraphic position marks them as laid down very early in the Long Drought suggests that the beginning of the Long Drought lagged behind the temperature change marking the beginning of the Altithermal age. The inception of the Long Drought in the Humboldt region is probably to be placed at about 4500 B.C.

[2] The radiocarbon date of 11199 ± 570 years for the earliest bat guano falls into what Antevs calls the "Stansbury stage" when the Great Basin lakes stood higher. The lake gravels at Leonard rockshelter lie at 4175 feet above sea level. The youngest of two radiocarbon dates from Danger Cave, Utah, based on wood lying just above the gravels exposed by Lake Stansbury in its dessication, is 11151 ± 570. Sheep dung from the same stratum gave a date of 11453 ± 600 (Johnson, 1951). The nearly exact agreement of dates for the same phenomenon is important in establishing a synchronism of events.

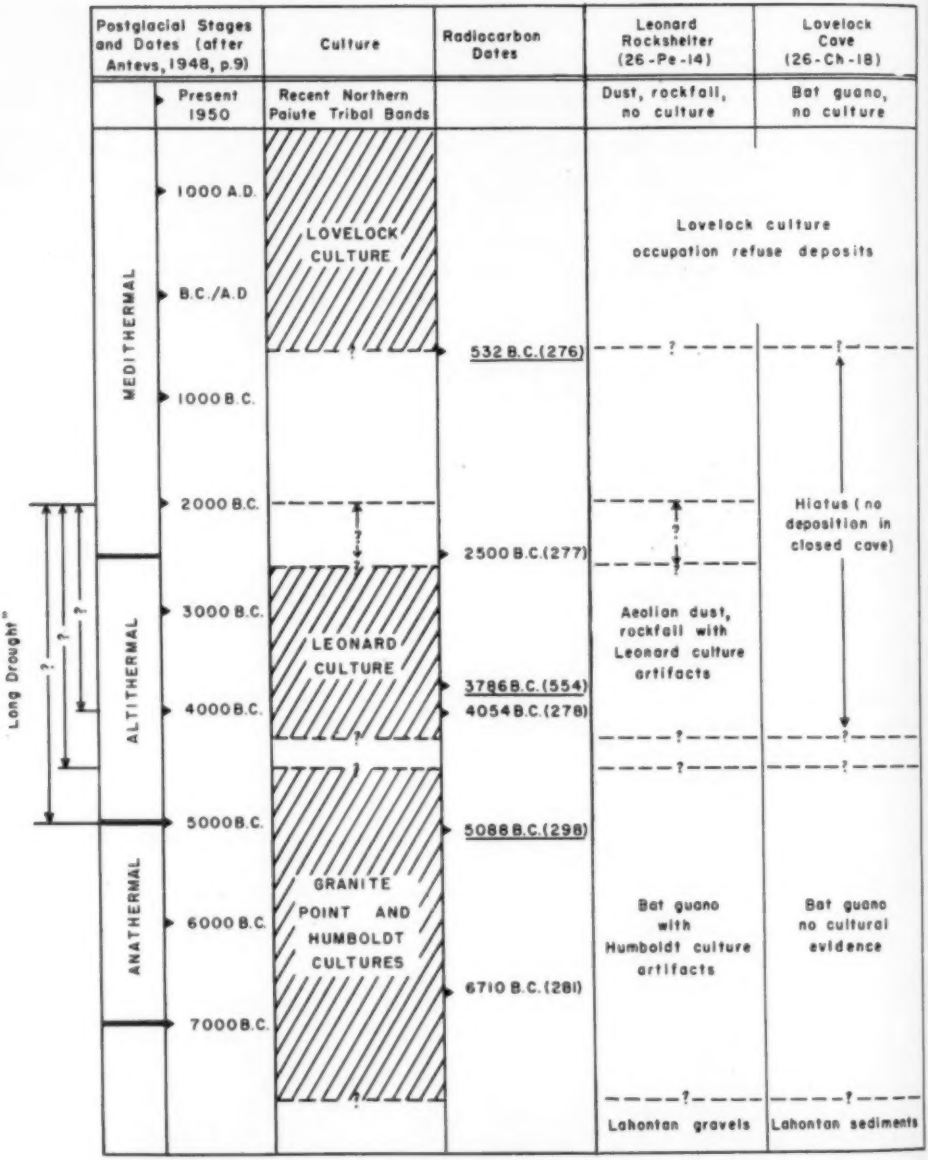

FIG 43. Cultural sequence in the lower Humboldt Valley region, Nevada. See text for justification and explanation. Radiocarbon dates are converted to B.C. dates with ± years omitted. Arnold and Libby (1950, pp. 10-11) sample numbers in parentheses. Underlined dates are based on actual artifacts.

It is of interest to note here that in the Humboldt basin sites two periods of heavy bat guano deposition are apparent. The earliest are those in the lower levels of Leonard rockshelter which contains Humboldt culture artifacts, and in the sterile guano layer which underlies the occupation refuse in Lovelock cave (Loud and Harrington, 1929, p. 120). This was laid down in the Anathermal period which was moist, and when Humboldt Lake contained water with marshy shores supporting rushes, and with an abundance of insects upon which bats could feed. The Altithermal period deposits in Leonard rockshelter lack bat guano, presumably because the aridity caused the disappearance of the insect food for bats. Lovelock cave which is closed, shows no evidence in its stratigraphy of the Long Drought since the aeolian dust did not penetrate the crevice entrance and the bats were gone. Reoccupation of the region by bats apparently occurred with the advent of the Medithermal and the rebirth of Humboldt Lake, and bats and man occupied Lovelock cave about 500 B.C. One wonders if the old entrance of Lovelock cave was not sealed or somehow obscured, and was reopened, perhaps by an earthquake, about 2500 years ago. At any rate and for whatever reason, the Lovelock culture group entered Lovelock cave about 500 B.C.[3] and lived on a bat guano surface laid down some 3500 years before (Arnold-Libby, sample 278 of pre-occupation bat guano dated 6004 ± 250 years B.P. or 4054 B.C.). The correlation of Lovelock cave and Leonard rockshelter stratigraphy and culture are shown in Figure 44. The Altithermal period Leonard culture is arbitrarily terminated on the chart at 2500 B.C. This is approximately the time the Basin Lakes were reborn about 2000 B.C. (Antevs, 1948, pp. 11-4). From a single find (the infant and basketry in area C) there is no real basis to suppose continuous occupation by that particular culture group for 1500 years or more in a region which may have permitted, but could hardly have encouraged settlement. Possibly intermittent occupation by migrating groups on their way to greener pastures characterized this time period in the valley of the Humboldt. With the rebirth of the Basin Lakes ca. 2000 B.C. in the Medithermal the Humboldt Lake region probably became as favorable for settlement as in the modern period, and we may presume that man again could live here in numbers and with economic security. Why, then, were the great caves not lived in earlier than 532 B.C., the date for the earliest occupation of Lovelock cave? Either this date does not accurately mark the initial occupation of the cave, or we have thus far failed to recognize surface materials which postdate 2500 B.C. and predate 500 B.C. In all probability both propositions are true, and the apparent absence of man for nearly 2000 years of the early Medithermal is awaiting the recognition of culture materials in open or in sheltered sites in the lower Humboldt Valley region.

The relative richness of the archaeological field of the lower Humboldt Valley is not to be taken as unique. Our evidence indicates that in any of the more favored Nevada localities real rewards await the archaeologist's shovel. It is to be hoped that other institutions may become interested in this portion of the Great Basin. The University of California will do what it can to rescue the area from undeserved limbo, but its main efforts will necessarily be devoted to California sites.

[3] Libby has, since this article was written, given us a radiocarbon date of 1953 ± 175 years for the oldest cultural remains (coiled basketry) in Humboldt cave.

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THE ROSE SITE, A STRATIFIED SHELL HEAP ON CAPE COD, MASSACHUSETTS

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THIS report deals with the results of excavating the last intact portions of a shell heap long known to collectors as one of the richest sources of artifacts on Cape Cod. Although the primary aim is to give a factual picture of the site, some idea may also be conveyed of the general archaeology of this isolated area, which exhibits cultural shadings differing somewhat from those of the rest of eastern Massachusetts.

As a preliminary, it may be noted that the historic Indians of Cape Cod were a coastal Algonquian group known as the Nauset. According to Willoughby (1935, p. 277), the Nauset probably constituted a subtribe of the Wampanoag centered on the southeastern mainland of this state. Natives in fairly large numbers were found on this 70 mile cape by Champlain in 1605, but these Indians were greatly reduced by plague a few years later, and with the establishment of white settlements, this decline continued. At the time of King Philip's war their remnants had neither will nor strength for fighting. Of the natives of the immediate area of the site here concerned, we have some account from first-hand observations by the Pilgrims, who, in 1620, twice reconnoitred the section they called

"Paomet," now a part of the town of Truro, Massachusetts. The "Journal of the Pilgrims" contains graphic descriptions of dome shaped, mat covered houses, and their equipment of baskets, earthen pots, and wooden dishes. There are also notes on the evidences of hunting, agriculture, and the practice of burial with red ocher. It is probable that at least the more recent of the prehistoric remains treated herein were left by this people.

The Rose site is 1½ miles northwest of the village of Truro Center, and about 9 miles from the extreme end of Cape Cod. It is in a section in which the terrain is markedly glacial, with steep rounded hills of gravelly sand, interspersed with numerous kettle holes. Crossing the cape, which is here only 2½ miles wide, is another glacial feature, a series of transverse valleys, containing tidal creeks and marshes, and emptying to the west into Cape Cod Bay.

In respect to its immediate position, the shell heap is on a strip of nearly level ground at the base of a small knoll, which rises from the bottom of a large depression, connecting to the south through a narrow opening with one of the transverse valleys, the now dyked Little Pamet River. Hills enclosing site and knoll slope abruptly to heights of from 50 to 100 feet. For the most part, the shell heap is on the property of Albert Rose, whose dwelling stands on the knoll, while the remainder is on the grounds of Miss B. L. Link. As nearly as can now be determined, the midden originally had substantial depth over an area of about 30 by 200 feet. It may be observed that the site is especially well placed, since it is sheltered, near a spring, and also near a formerly navigable marsh leading to the bay, ¼ of a mile distant.

The greater, and apparently the most productive, part of the midden was dug out some 12 or 15 years ago by the Rose family and other amateur collectors. By all accounts, artifacts in large numbers were then unearthed. In 1945, Edward Rogers and I spent four days investigating the area on the Link property, work of which brief mentions have appeared (Moffett, 1946, p. 21; Bullen, 1948, p. 43). As already indicated, this paper is concerned chiefly with later excavations made in 1949 and 1950, to obtain as full information as possible from the small area remaining undisturbed. The lately dug section is in the south part of the site and lies on both sides of the line fence. Most of it, however, is on a portion of the Rose property that was not available to earlier excavators. In all about 850 square feet were excavated.

Since three cultural divisions were revealed, it will be convenient to think of the artifact bearing strata as having comprised three zones. (1) The upper zone consisted primarily of an 8 to 12 inch layer of compact black earth and shell. An overlying 3 to 4 inch stratum of dark gray earth, of meager artifact content, is included in this zone, as are also pits going down from black earth and shell. (2) The intermediate zone was a 4 to 7 inch layer of dark brown, discolored sand, which held only a small amount of shell. (3) The bottom zone was the normal, light yellow, glacial sand, which contained artifacts and broken rock to a depth of 8 inches. Shell was absent from this level. At a short but varying distance down in the yellow sand, a thin layer of gravel was encountered, and at the border nearest the spring it was found that this gravel had once outcropped to form the surface of early Indian times. As the southern end of the site was approached, there was a noticeable thinning of the dark shell bearing stratum. Throughout most of the area the shell heap was covered with from 15 to 25 inches of gray sandy top-soil, which from its content appeared to be entirely a post-Indian accumulation washed down from adjoining fields. An exception to this was observed in a few squares farthest removed from high ground, with a plowed mixture of loam and camp debris extending from the grass roots to a depth of 16 inches.

Pits belonging to the black earth and shell layer were found in nearly every square. The first of two general types, apparently a refuse pit, was commonly V shaped, relatively narrow, and filled with black earth and shell, or with the latter mottled with dirty sand. This sort of pit often extended through the yellow sand to end at the gravel. The second type of late pit was a scooped out basin shaped depression in which fires were built. In this case the fill was complex, with lenses of black earth and shell, lines of fine burned material, and deposits of mottled sand alternating with one another in a confused manner. Pits originating in the second zone were more rare, and when

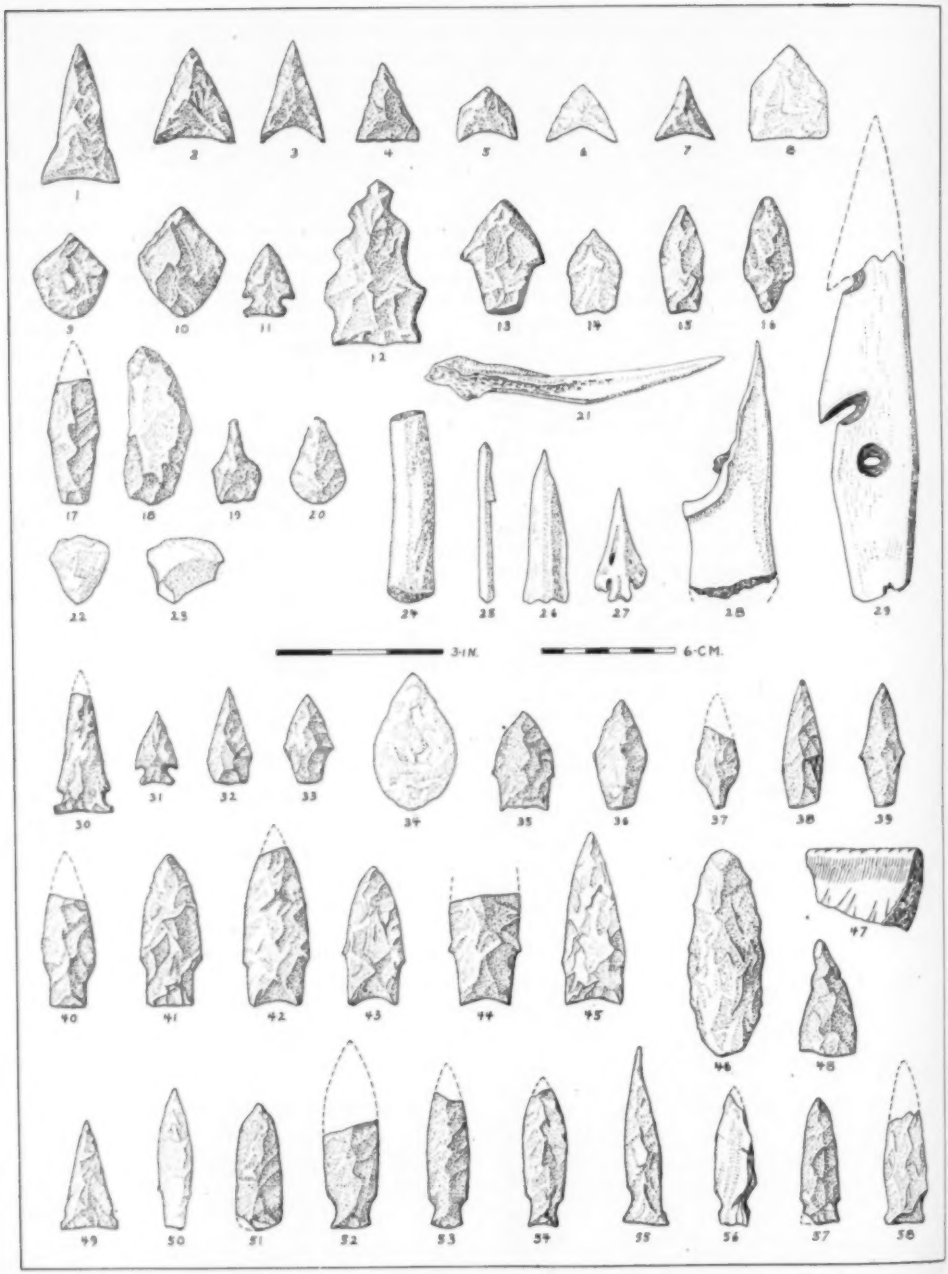

FIG. 44. Rose site artifacts of stone, bone, and antler. Top zone: *1-29*. Intermediate zone: *30-45*. Bottom zone: *46-58*. Stone materials: *6, 8, 14, 22, 23, 34, 50*, quartz; *10, 12, 13, 30, 41, 43, 44, 46, 49*, quartzite; *56, 58*, slate; *45*, chert; all others are felsite.

found were usually shallow and filled with either brown sand or reddish burned sand. Patches of the last material sometimes occurred in connection with this zone where no pit was involved. No burial pit was found during the late work or, according to the Rose family, had been at any previous time. However, I discovered a human femur in thrown-out dirt, indicating that someone had disturbed a grave.

The oyster was the favorite shellfish, with the clam and the quahog next in order. Scallops, mussels, and other varieties of shellfish were consumed to a lesser extent. It will have been noticed, however, that most of the shell remains date from the last period of occupation. Fish were used, including among large fish, the sturgeon. The deer was the most important game animal. Bones of the dog were present, as well as those of smaller animals not identified as to kind. Water fowl and other birds were hunted. No trace of vegetable foods was recognized, although it may be presumed that agriculture was practiced in at least the last occupation stage.

Essential information about the classifiable artifacts found in the late excavations is embodied in Tables 3 and 4, and Figures 44 and 45. Although the forms of chipped implements are to be seen in Figure 44, it may be

TABLE 3, CHIPPED STONE ARTIFACTS

Type	Fig. No. 44	Quantity	Length, MM.	Material Qtz.	Fel.	Qtzite	Misc.
Top Zone							
Broad Triangular	1-7	96	30-55	42	50	2	2 Chert
Trianguloid, Squared Base	8	7	34-52	5	1	1	
Trianguloid, Rounded Base	9	4	40-60	1	1	2	
Trianguloid, Pointed Base	10	5	53-60	2	2	1	
Trianguloid, Corner Notched	11	2	32		2		
Trianguloid, Multiple Notched	12	1	75			1	
Trianguloid, Stemmed, Sharp Corners	13	1	55			1	
Ovate, Stemmed, Round Corners	14	2	37	1	1		
Lanceolate, Straight Base	15	1	50		1		
Lanceolate, Stemmed, Round Corners	16	1	52		1		
Elongate, Stemmed, Round Corners	17	2	75		2		
Asymmetrical Knives	18	2	60	1	1		
Drill	19	1	37		1		
Round-base Point	20	1	40		1		
Blunt Point	22	3	25-37	3			
Scraper, Snub Nose	23	2		2			
Intermediate Zone							
Trianguloid, Side Notched	30	1	60			1	
Trianguloid, Corner Notched	31	1	35		1		
Trianguloid, Short Stem	32	1	45		1		
Trianguloid, Stemmed, Sharp Corners	33	1	40		1		
Ovate	34	1	60	1			
Ovate, Stemmed, Sharp Corners	35	2	45, 53		2		
Lanceolate, Tapering Stem	36	1	50			1	
Lanceolate, Pointed Base	37	3	40-45		1	2	
Elongate	38	1	58		1		
Elongate, Spurred	39	1	58		1		
Lanceolate, Straight Stem	40, 41	4	62-70	1	2		1 Shale
Lanceolate, Stemmed, Concave Base	42-45	9	65-90		2	6	1 Chert
Bottom Zone							
Trianguloid, Eared	49	1	50			1	
Lanceolate		1	65		1		
Elongate, Convex Base	51	1	58		1		
Elongate, Stemmed	50	2	62	1	1		
Elongate, Notched	52-58	13	60-90		8	2	3 Slate
Elongate Scraper	46	1	95			1	
Asymmetrical Knife	48	1	54		1		

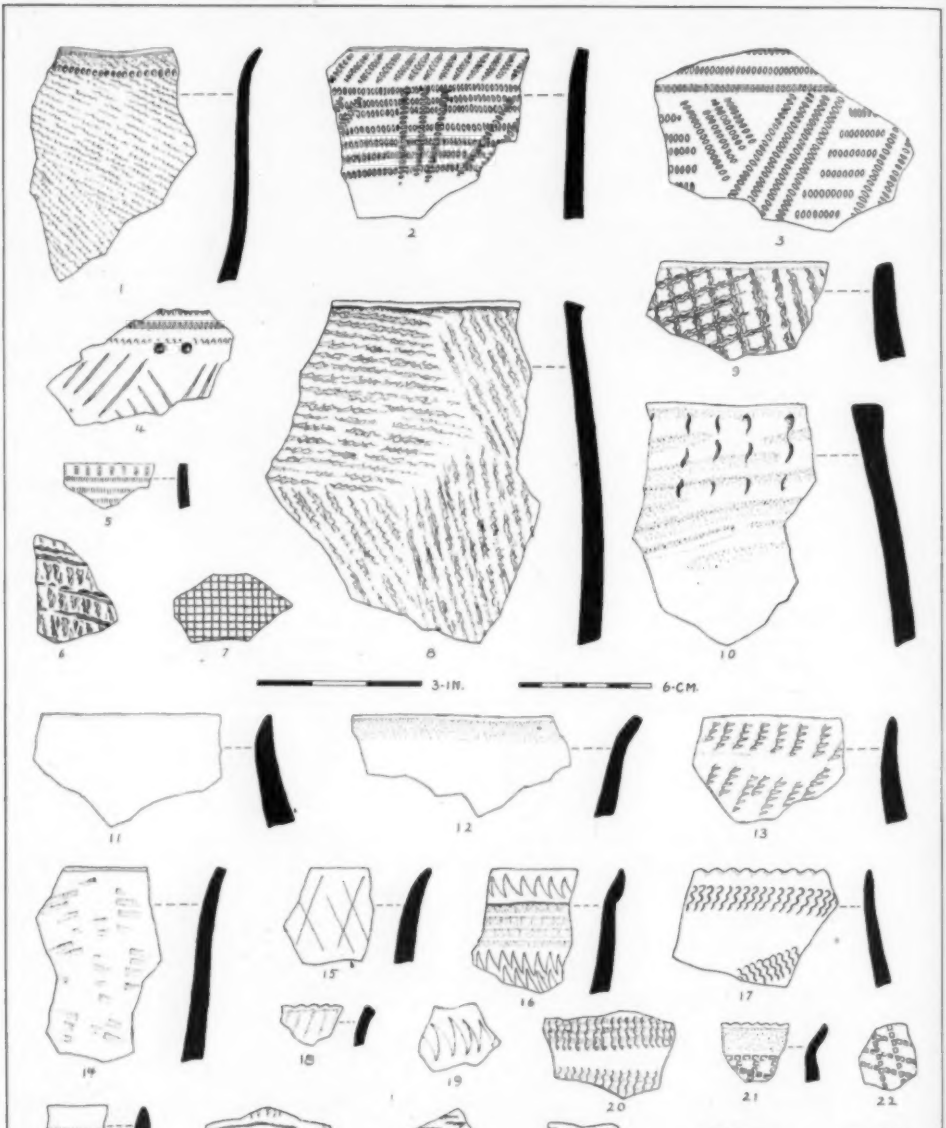

FIG. 45. Rose site pottery. *1-10*, shell tempered; *11-27*, mineral tempered.

TABLE 4, ARTIFACTS OTHER THAN CHIPPED STONE

General Type	Illustration	Quantity
Top Zone		
Pottery, Shell Tempered	Fig. 45, *1-10*	49
Bone Harpoon	Fig. 44, *29*	1
Bone Awls	Fig. 44, *21, 26-28*	5
Solid Bone Points	Fig. 44, *25*	2
Bone Needle		1
Antler Flakers	Fig. 44, *24*	2
Stone Axe		1
Stone Balls		1
Hammerstone		1
Whetstone		1
Intermediate Zone		
Pottery, Shell Tempered		4
Pottery, Mineral Tempered	Fig. 45, *11-26*	45
Solid Bone Point		1
Antler Flaker		2
Bottom Zone		
Pottery, Mineral Tempered	Fig. 45, *27*	1
Steatite Bowl Sherd	Fig. 44, *47*	1
Hammerstone		1

well to comment respecting diagnostically important types. Triangular points have a broad base, with about 75 per cent of them suggesting the equilateral. They are usually medium to large, only 16 per cent being less than 30 mm. long. Over one-half have straight sides, with the frequency of excurvate, incurvate, and double curvate, or S shaped, sides decreasing in the order named. While some specimens in this category are finely chipped, the general run of work is mediocre, many of the objects being thick and lopsided.

In regard to the spearheads having concave bases, which are distinctive of the intermediate zone, the lower part of the artifact is usually carefully retouched, giving a thin base, with often sharp basal corners (Fig. 44, *44, 45*). The stem is relatively wide, sometimes barely narrower than the blade. In cases where the shouldering is well pronounced, the lateral corners also are sharp or spur-like (Fig. 44, *43, 44*), the latter being a feature extending to other chipped traits of this zone. The fact that a large percentage is of quartzite is also characteristic of these spearheads.

Elongate notched points, diagnostic of the lower zone, might well be subdivided into two types. One would include well made specimens with a relatively narrow base and a blade that expands slightly as it rises (Fig. 44,*52-54*). The other would take in cruder points with a wide base and a contracting blade (Fig. 44, 55, 56, 58). The two varieties, however, were closely associated, and it is possible that the latter form represents the former in imperfect material.

Of the heavy stone implements, none of which are illustrated, the one axe is large and unpolished. Although broken, a contracting bit indicates the grooveless type. The two stone balls, unusual artifacts for this area, have a spherical shape and seem to have been smoothed, suggesting use in some process of grinding. Both specimens are of felsite, and the slightly larger of the two has a diameter of 9 cm. Recognizable hammerstones were rare. The two examples are oval beach pebbles with abraided ends. The one whetstone is an unmodified cobblestone, 8 by 9 by 19 cm., on which there is a natural concavity. The latter is well polished over a space of 4 by 11 cm.

Felsite patination as an indication of age is hard to evaluate on the end of Cape Cod, where glacial pebbles of this material occur in a great variety of colors and textures. Some pebbles are more stable than others. Felsite artifacts from the two higher zones show no patination worth mentioning. But of 22 felsite specimens from the lowest zone, 11 are much grayed and the remainder are moderately to slightly so. When contrasted with the darkness of higher specimens, this amount of weathering in the bottom zone appears significant.

POTTERY

For the purpose of description, I have divided the pottery into four classes. The first two have shell temper, and, with four exceptions, the sherds were found in the top zone. The last two classes have mineral temper, and, save for one occurrence in yellow sand, the specimens came from the intermediate zone. It may be observed that, with the possible exception of class 1, the broad affiliations of the pottery seem to lie with the Point Peninsula (Ritchie and MacNeish, 1949) and the Windsor (Smith, 1950) traditions of, respectively, interior New York, and coastal New York and southern Connecticut.

CLASS 1, FINE SHELL TEMPERED (Fig. 45, *1*).

Rim; everted. *Lip*; narrow, flat. *Bottom shape*; not known. *Wall thickness*; 4-7 mm. *Exterior*; entirely covered with unsmoothed cord paddling. *Interior*; smooth, speckled with fine to medium shell flakes. *Decoration*; one annular line of indentations, probably from the edge

of the paddle. *Color*; dark gray. *Condition of sherds*; hard and firm. *Coiling*; no evidence. *Comment*; this ware was relatively unimportant at the site, nearly all of the recovered sherds pertaining to one vessel.

CLASS 2, COARSE SHELL TEMPERED (Fig. 45, *2-4, 6, 8-10*).

General description: *Rim*; straight or nearly so, usually inclines inward. *Lip*; flat, sometimes outsplayed. *Bottom shape*; globular for the one pot determined, others may have been conoidal. *Wall thickness*; 8-13 mm., usually about 10 mm. *Interior*; usually coarsely channeled. *Color*; tan to gray, sometimes reddish on cord surfaced specimens. *Condition of sherds*; soft and friable. *Coiling*; evidence strong. *Size of pots*; large, mouth diameters up to 40 cm. *Comment*; nearly all of the top zone pottery is of this class.

TYPE A, CORDED-STICK DECORATED (Fig. 45, *2-4*). *Exterior*; smooth. *Decoration*; horizontal corded-stick lines, commonly also oblique lines. *Unusual variant*; corded-stick combined with incised lines and punctation (Fig. 45, *4*, from the collection of the Rose family).

TYPE B, CORD SURFACED, UNDECORATED (Fig. 45, 8, 9). *Exterior*; entirely covered with coarse cord paddling. *Decoration*; none.

TYPE C, SCALLOP SHELL DECORATED (Fig. 45, *10*). *Exterior*; shallow rounded grooves, made by dragging the back of a scallop shell. *Decoration*; indentations from the edge of a scallop shell. *Comment*; rare, very crude.

MISCELLANEOUS SHELL TEMPERED SHERDS.

Plain rims; none found in the late excavations, the few known from the site belong in the coarse, shell tempered class. *Coarse fabric or matting surfaced* (Fig. 45, 6); two small sherds of class 2 were found. *Very fine corded-stick* (Fig. 45, 5); one sherd in the collection of the Rose family. *Square checked* (Fig. 45, *7*); one sherd in the above collection, apparently made by impressing a thin square-edged strip; unusual for this area.

CLASS 3. MEDIUM TO COARSE MINERAL TEMPERED (Fig. 45, *11-26*).

General description: *Rims*; usually a slight to pronounced eversion, sometimes thickened. *Lip*; either flat or rounded, sometimes notched. *Bottom shape*; not determined. *Wall thickness*; usually 7-9 mm. *Exterior*; smooth to gritty, except on rare cord surfaced pots. *Interior*; smooth to gritty, never channeled. *Color*; grayish tan to dark gray. *Temper*; derived from granite. *Coiling*; evidences occasionally present. *Size of pots*; medium. *Comment*; in this area this class of pottery exhibits many variations and combinations; since it is difficult to recognize steady recurrent types, the several known methods of decorating will be merely noted.

KINDS OF DECORATION. *Plain* (Fig. 45, *11-12*). *Dentate* (Fig. 45, *13*); carelessly jabbed imprints of a toothed object. *Obscure rectangular indentations* (Fig. 45, *14*); made by dragging a square toothed implement. *Scratched lines* (Fig. 45, *15*). *Plain rocker* (Fig. 45, *16, 19*). *Scallop shell* (Fig. 45, *17, 20*). *Crossed lines of square indentations* (Fig. 45, *21, 22*). *Complex rocker* (Fig. 45, *24, 25*); areas of scallop shell rocker and dentate rocker enclosed within two-line borders probably made with the edge of a clam shell. *Cord surfaced* (Fig. 45, *26*); only one sherd found.

CLASS 4, COARSE MINERAL TEMPERED (Fig. 45, *27*).

Exterior and Interior; cord surfaced. *Thickness*; 10 mm. *Comment*; this is the ware usually called Vinette 1.

As respects the top zone, class 1 pottery may have been relatively late, since the recovered sherds were higher than nearby specimens of class 2. The four small shell tempered sherds listed from the intermediate zone were probably intrusive, although it is hard to be certain about this. Another ambiguity involves the only two specimens of Vinette 1 type, both from the same pot, one at the juncture of the second and third zones, the other two inches lower and definitely in yellow sand. From general experience with this pottery in this area, I would attribute these sherds to the start of the intermediate period. At any rate, they appeared to be disassociated from early stone artifacts.

Specimens excavated years ago by members of the Rose family have already been mentioned. This collection, which includes many more objects than were found during the late work, has been of value as a check in the preparation of this report. Of 232 chipped points, which takes in only complete specimens, 78 per cent are triangular and only 12 per cent are stemmed. Other stone implements include: a celt; two notched net-sinkers; fragments of two slate gorgets; and sherds from at least two steatite bowls. About 60 bone and antler implements are present, mostly awls, but included is a large harpoon similar to the one here illustrated. The pottery is largely of the coarse shell tempered class. It is obvious that, although undocumented, most of this material refers to the latest period of occupation. The collection indicates for the late excavation, a fairly adequate sampling of the site.

DISCUSSION AND COMPARISONS

As anticipated early in this report, we have at this site a pattern of stratigraphic relationship disclosing three distinct cultural compartments. To generalize, it may be said of these: that the latest is defined largely by an associa-

tion of class 2 pottery with broad triangular points; that the intermediate is marked chiefly by an association of class 3 pottery with stemmed points; and that the earliest is characterized in the main by narrow notched points. We may now examine each of the typological groups as to its place in the more general sequence indicated for this area.

The late group has been reported from the higher of two zones at two other shell heaps at this end of Cape Cod (Torrey, 1946; Bullen, 1948, Fig. 8), and it has been discovered at other local sites not published. That this association is probably to be found over all of Cape Cod is indicated by the fact that it has been made known from a series of shell heaps near the mainland (Bullen and Brooks, 1948). The association, therefore, marks a well developed, late ceramic horizon of this region. As this manifestation occurs from site to site, however, there are as regards pottery certain variations, which, as Bullen (1948, p. 39) has indicated, probably have chronological significance. Although definite stratigraphic evidence is lacking, it seems likely that a first phase of the horizon is featured by class 2, type B vessels alone; a second phase, by a concurrence of the latter type with type A; and a last phase by the emergence of a ware which Bullen (1948, p. 39) has called Late Prehistoric 2, of which the present class 1 pottery is a probable variant. It appears, then, that the bulk of the top-zone material from Rose may be tentatively placed at about midway of this late horizon.

As regards the intermediate compartment, we again have an association found at both reported (Torrey, 1946; Bullen, 1948, Fig. 8; Moffett, 1949) and at unreported sites. It is at some locations overlain by materials of the late horizon, and at some underlain by still earlier artifacts. Thus, we have here an intermediate, or early ceramic, horizon which is well distributed on Cape Cod. This horizon is typologically richer than the late, and it shows also more variation from site to site. Although class 3 pottery is the most steady diagnostic, this ware is sometimes accompanied by an appreciable amount of Vinette 1. Stemmed points may differ noticeably from one place to another, in the type of stemming, in the shape of the blade, and so on. To give instances of the latter, bringing in the present site, the distinctive concave-base spearheads of Rose are to be found rarely at other local sites, and conversely, a type often called corner-removed (which has a stem relatively narrow in respect to blade) was at best only dubiously represented in middle Rose (Fig. 44, *13*, 33), although the type is an important associate of class 3 pottery at other components of the horizon. The near absence of quartz is another divergent aspect of this level of Rose. This certain lack of conformity doubtless has chronological import. Although the last is obscure from a typological point of view, the fact that the present felsite implements are unpatinated, whereas those of the same horizon, and from deposits of similar nature, at some other shell heaps are strongly weathered, suggests that the second zone here may date from near the end of a manifestation of long duration.

The stone artifacts from the lowest zone of Rose, which were concentrated mainly near the spring, in an area in which no pottery was found, I consider to represent a probable preceramic stage. However, such a horizon, as it is better known in this section, is distinguished by such traits as the following: eared points; very small quartz points, both stemmed and triangular; large, patinated felsite blades; whale-tail pendants; choppers; gouges; and plummets. Since, with the exception of one eared trianguloid, no example of the above traits was found in this level of Rose, the latter must be considered somewhat unique for this area.

When comparisons are extended to include the mainland of eastern Massachusetts, it becomes apparent that Cape Cod is not, archaeologically, an exact replica of the rest of this state. Although divergencies are perhaps not great enough to effect broad sequential aspects, they seem worth mentioning. For one thing, some ceramic traits do not appear to have reached those portions of Cape Cod about which much is known. This is particularly true of anything resembling an Iroquoian influence. On the other hand, class 2, type A, prominent here, seems to be rare on the mainland; Bullen (1948, p. 42) gives only one off-cape occurrence of this type, which he calls Late Prehistoric 1. Another variant feature involves the fact that the abrupt division based on both type and temper that cuts through this region seems to become blurred elsewhere. Then too, ceramic types and stone types are not always synchronized in the same way in both areas. A notable instance of the latter is

the occurrence of corner-removed and straight stemmed points in ceramic strata on Cape Cod, whereas on the mainland such points are distinctive of non-pottery levels (Bullen, 1949, pp. 76, 133; Fowler, 1950). In regard to the above it is well to observe that the isolation of this area may have made for a development differing somewhat from that of the rest of this state.

In respect to comparisons with still more distant regions, it will be remembered that pottery affiliations with areas well to the west and southwest have been mentioned. To enlarge on a view first outlined by Bullen (1948, pp. 44), it appears that the two ceramic horizons found at the present site, and extending also over much of Cape Cod, are roughly parallel with certain foci of the Windsor aspect of the Coastal phase, as defined by Smith (1947, 1950) and by Rouse (1947) for coastal New York and Connecticut. I regard the late horizon of this area as broadly corresponding with the Sebonac Focus of the above aspect. Rim forms and rough interiors of coarse shell tempered pottery appear to be the same in both instances, although horizontal and oblique corded-stick decoration is not reported on any Windsor sherds, and seems to be distinctive of East River specimens. At this level on Cape Cod we probably have a direct extension of influences from the Long Island Sound region. Regarding the earlier ceramic horizon here, there is a general equation with the Clearview and North Beach foci of the Windsor aspect. It would seem that on Cape Cod we have something resembling a telescoping of the last two foci. In the case of the early ceramic level of this area, however, it might not be correct to envisage a coastal movement from the southwest, for the class of dentate and rocker stamped pottery involved does not seem to have had as varied a development in the latter quarter, including New Jersey (Cross, 1941), as it had in interior New York (Ritchie and MacNeish, 1949, Fig. 37), on Cape Cod, and in coastal areas to the north thereof, including Maine (Willoughby, 1935, Figs. 109, 111).

SUMMARY

The earliest of three occupational periods at the Rose site sees a band of early campers, whose artifacts, so far as known, consist mainly of elongate notched points. These Indians used a few steatite bowls, but they were probably unacquainted with clay pottery. The presence of bone and the absence of shell in their scanty debris suggests a hunting economy. That this first occupation was somewhat remote in time is indicated by the patinated condition of many of the felsite implements. In the second period we have a people using mineral tempered pottery and several types of stemmed points, of which concave-base spearheads are the most distinctive. Since a midden deposit was formed, this occupation was obviously more intense than the first. Shellfish, however, were still not much sought, and it is not known whether agriculture was practiced. In the last and most populous stage of the site, we find a group using shell tempered vessels of large size, along with chipped implements largely of broad triangular type. In addition to game, a great many shellfish were consumed. Despite a lack of evidence, by this time agriculture was doubtless a part of the economy. The materials of the two latest periods represent two, definitely marked and widespread, prehistoric levels on Cape Cod. Furthermore, each of the three horizons of the site, although exhibiting some rather local features, appears to be of broad connection in the general northeastern region.

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Provincetown, Mass.
March, 1951

EARLY MAN SITES NEAR CONCHO, ARIZONA

FRED WENDORF AND TULLY H. THOMAS

FOR THE PAST TWO YEARS Mr. and Mrs. Tully H. Thomas of Concho, Arizona have been collecting surface material from thirty or more non-pottery sites located within a twenty-mile radius of their home (see Fig. 46). Included among the points from these sites are fluted points, indistinguishable from Folsoms (Wormington, 1949, pp. 19-48), parallel flaked points, previously called Yumas (Wormington, 1949, pp. 48-68), and many others best described as similar to Pinto (Campbell, 1935) or Amargosa II (Haury, 1950, p. 193) points of the so-called Desert culture of southern Arizona and California. The importance of this Concho discovery will be immediately recognized by those familiar with the prehistory of the American Southwest. Although early man materials have been recovered from southern Arizona (Haury, 1950; Sayles and Antevs, 1941), both eastern (Cook, 1927, pp. 240-7; Hibben, 1941; Howard, 1935, pp. 299-303; Roberts, 1942) and western (Bryan and Toulouse, 1943, pp. 269-80) New Mexico and adjoining California (Campbell, 1935 and 1937; Rogers, 1939) and Nevada (Harrington, 1935), thus far, except for a somewhat baffling Little Colorado Industry (Bartlett, 1943, pp. 266-8), that portion of Arizona north of the Mogollon Rim and com-

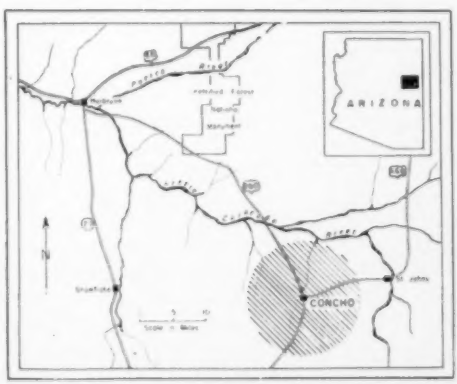

FIG. 46. Map of the Concho area. Hatched area indicates region where non-pottery sites are concentrated.

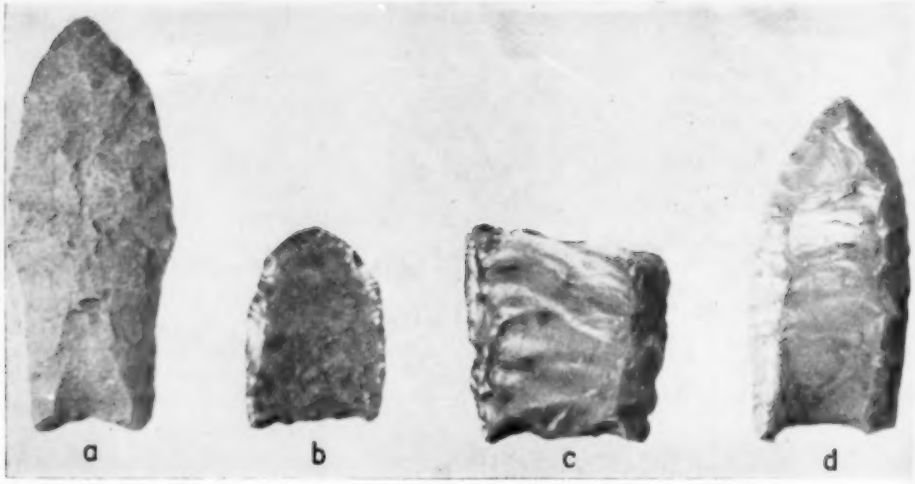

FIG. 47. Fluted points found in sand blowouts near Concho. All of chert. Length of *a*, 6.1 cm.

prising the Colorado Plateau, has never produced clearly defined early man materials.

The Concho area was an ideal location for early hunting groups to concentrate. Broad prairies, permanent natural lakes, flowing streams and springs attracted many of the game animals important in early hunting economy.

The sites discussed in the following pages were visited and surface collections made therefrom by Kirk Bryan and the senior author in the company of Mr. and Mrs. Thomas during the summer of 1950. Inasmuch as the sites thus far visited offered little inducement for extensive excavation, it was decided to present the data recovered through surface collecting rather than to withhold announcement until more adequate data had been obtained.

Generally situated on high, almost barren mesas well away from the major drainages the sites offered little to attract later agricultural groups. It is, therefore, a fortunate circumstance that most of the sites are uncomplicated by the presence of artifacts belonging to later pottery using peoples. Some sites, of course, were reoccupied by later groups and the collections from these contain not only pottery but also the small, thin triangular points often found in late sites in this vicinity. However, the typical site is large, often comprising several acres littered with fire-cracked rocks, utilized flakes and other stone artifacts but consistently lacks pottery, visible architectural remains, or other indications of contemporaneity with any of the known Basketmaker-Pueblo horizons. At most sites the material rests directly on the sandstone bedrock or on a thin sand cover immediately overlying this sandstone. It is evident that this situation offers few opportunities for dating by geologic means and at the same time precludes any possibility for cultural segregation through stratigraphic studies, although typological analysis, based on comparisons with adjacent areas, indicates successive occupation by several cultural groups through a considerable span of time.

The specimens have been classified into the following groupings which are based upon two points of evidence: (1) Repeated association and (2) comparison with similar materials recovered in adjacent areas under conditions offering more satisfactory basis for determining their correct relative chronological position.

Folsom. One complete and two fragmentary fluted points have thus far been found in the Concho area, all from different sites. These points are illustrated in Figure 47, *b-d*. Salient features not evident from the illustrations are the presence of fluting on both faces and the smoothing or grinding along the sides of two of the points (Fig. 47, *c, d*). In addition, surface collecting by the senior author at one

of the sites which produced a fluted point resulted in a second point (Fig. 47, *a*) which, although it lacks the fluting, has smoothed sides and is heavily patinated. At this and other Folsom sites the artifacts are found in sand blowouts, suggesting that the Folsom occupation preceded the deposition of the widespread sand canopy, generally considered as dating from the post-glacial optimum (Hack, 1942, pp. 45-69). Inasmuch as no faunal remains have been found in the sites producing fluted points further inferences on dating these finds would be unwarranted by the available evidence. Artifacts other than points which are associated with the Folsom sites are rare and consist mostly of random flakes utilized as scrapers and knives.

Parallel Flaked Points. Included in this category are points which have a wide variety of shapes and few commonly shared characteristics but which as a group are sometimes referred to as Yuma or Parallel Flaked points (Wormington, 1949, pp. 48-68). Figure 48, *a-d* and *g* gives an adequate sample of the range of shapes encountered in the Concho sites. Parallel Flaked points occur repeatedly in sites in which are found artifacts of the Concho complex described below. Furthermore, no sites are known where Parallel Flaked points occur to the exclusion of these other types, indicating that Parallel Flaked points may actually form a component of the Concho complex. However, the possibilities for mixture through reoccupation together with the evidence from other areas suggesting that types similar to those found in the Concho complex are later than the Parallel Flaked points leads us to consider them separately. Artifacts which may have accompanied the Parallel Flaked points could not be distinguished from those comprising the Concho complex and are, therefore, considered with that group.

Concho Complex. The majority of the nonpottery sites found in the Concho area may be ascribed to this complex. Projectile points associated with the complex are of three major varieties: 1) a medium sized point (average length, 4.2 cm.) with a bifurcated base, well developed shoulders and barbs and serrated edges (Fig. 49, *a-h*); 2) a small point (average length, 4.0 cm.) with a short contracting base, pronounced barbs and shoulders and a triangular blade (Fig. 49, *i* and *j*); and 3) a medium to large point (average length, 5.8 cm.) with a long tapering stem, weak shoulders and often an asymmetrical blade (Fig. 49, *k-m*).

FIG. 48. Parallel flaked points (*a-d* and *g*) and atypical points (*e* and *f*) found in sites also producing parallel flaked points. Points *d* and *f* made from chalcedony, remainder of chert. Length of *a*, 8.5 cm.

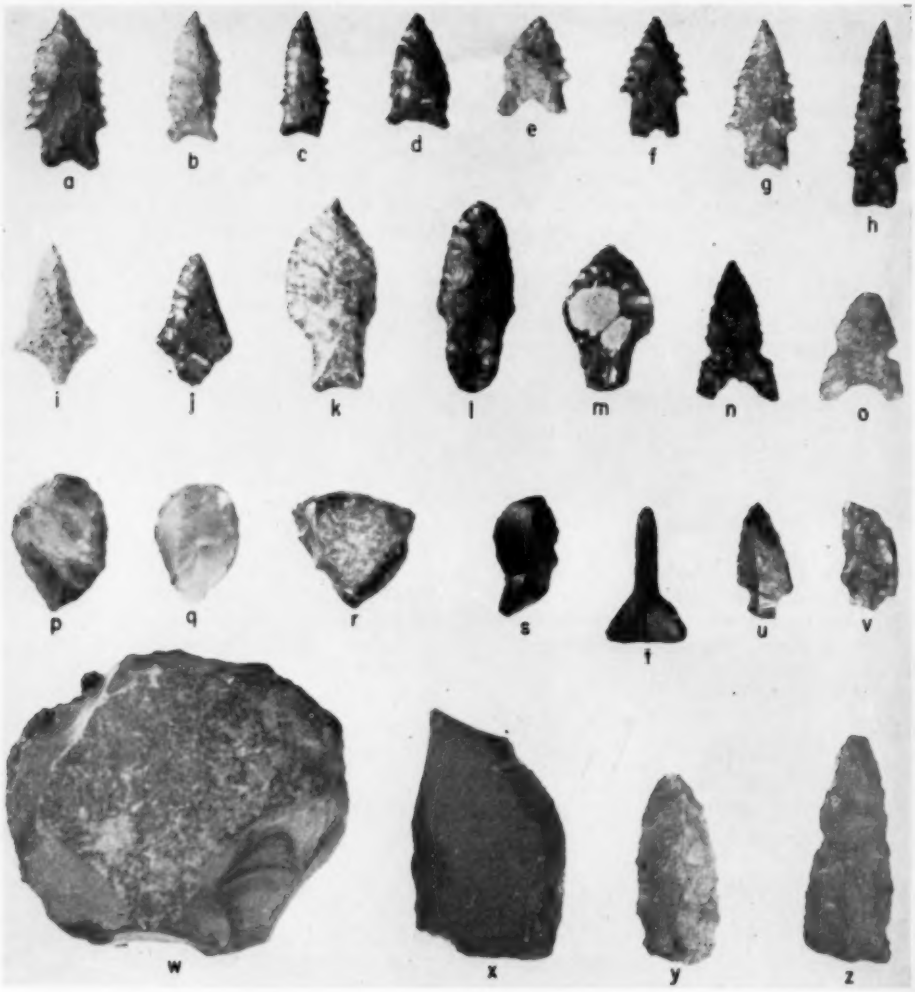

FIG. 49. Artifacts assigned to the Concho complex. *a-o*, projectile points and knives; *p-r*, steeply chipped end and side scrapers; *s*, random flake utilized as a scraper or knife; *t*, drill; *u* and *v*, stemmed knives; *w*, bifacially worked chopper; *x*, steeply chipped large side scraper; *y* and *z*, leaf-shaped blades; *p*, *q*, and *s*, chalcedony; *w* and *x* of rhyolite; remainder of chert. Length of *a*, 5.1 cm.

This latter may have been used as a stemmed knife rather than a projectile point. It is to be noted that the first variety has certain superficial resemblances to both Pinto (Campbell, 1935) and San Jose (Bryan and Toulouse, 1943) points and the second type is similar to those found in Gypsum Cave (Harrington, 1935). What might be considered as a fourth type is illustrated in Figure 49, *n-o*; however, this variety is rare and is not reported from all sites of this complex. Accompanying these points are numerous flake knives and scrapers (Fig. 49, *s*), a few steeply chipped end and side scrapers (Fig. 49, *p-r*), bifacially worked choppers (Fig. 49, *w*), leaf shaped blades (Fig. 49, *y-z*), stemmed knives (Fig. 49, *u-v*) and,

rarely, expanded base drills (Fig. 49, *t*). In one site producing the Concho complex the cultural material lies on top of a small fossil sand dune which in turn rests directly on sandstone bedrock. It may be guessed that this dune formed during the post-glacial optimum, although proof of its exact chronological position could not be obtained. Thus, if the above supposition be correct, the overlying cultural material at this site is probably later than the post-glacial optimum, which, according to Hack (1942, p. 64), dates after 6000 B.C. An even later date is suggested by Bryan (in Haury, 1950, p. 126) who considers the warm, dry period of the post-glacial optimum to have lasted until around 2500 B.C.

Basketmaker. By way of rounding out the description of the non-pottery sites found in the Concho area mention should be also made of several sites producing corner notched projectile points of a type often associated with Basketmaker materials in the Four Corners district (Fig. 50). Since these open sites contain no perishable materials which would facilitate comparison with Basketmaker cave sites, identification depended upon similarities between the two stone complexes, a somewhat hazardous undertaking in view of the scanty data available on Basketmaker stone tools. Certain resemblances, particularly in projectile point shapes, may also be seen with the San Pedro stage of the Cochise culture in southern Arizona. We feel, however, that the absence of the typical Cochise pulper plane, and the relative scarcity of grinding tools, such as manos and metates, in these Concho sites and their abundance in sites of the Cochise culture supports our assertion that they are Basketmaker in origin and not Cochise. It is interesting to note that the earliest pottery pro-

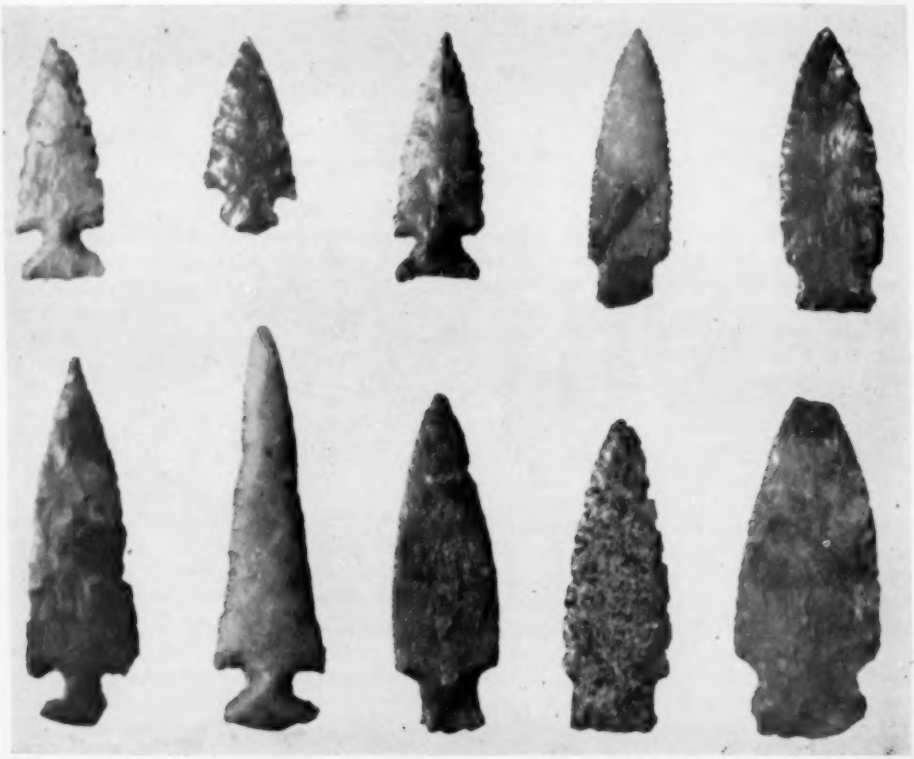

FIG. 50. Basketmaker style points. Length of point in upper left hand corner, 5.2 cm.

ducing sites (Lino Gray, see Colton, and Hargrave, 1937, p. 191-2) in this area have a lithic complex indistinguishable from these presumably earlier Basketmaker sites. Accompanying the projectile points at these sites are the inevitable random flake scrapers and knives, steeply chipped scrapers, flare based drills, drills made from broken projectile points, stemmed knives, one-handed manos and basin metates. It is our impression that besides the obvious differences in projectile points the most distinctive feature of sites of this horizon is the presence of grinding implements. This may suggest a shift in subsistance patterns from hunting toward gathering of wild seeds or possibly the appearance of agriculture in this area.

Both fluted and parallel flaked points have been reported previously from Arizona although not in sufficient quantities to indicate an extensive occupation and never under conditions warranting any assumption of great antiquity (Wendorf, 1950, p. 50). The primary importance of the finding of these types in the Concho area lies in their repeated presence in this restricted locality under conditions, at least for the fluted points, which suggest an antiquity comparable to other Folsom finds in adjacent areas. The range of these two types may now be extended to this hitherto negative area.

As suggested above, the Concho complex has similarities to lithic industries found in areas both east and west, as well as south of the Concho area: the San Jose of western New Mexico and the Pinto-Gypsum of eastern California, Nevada and southwestern Arizona. In this respect the Concho complex may be viewed as bridging the gap between these two similar although not identical groups.

Important differences, particularly from the Pinto-Gypsum complex, warrants our consideration of the Concho as a distinct unit. It is to be noted that pulper planes, second only to projectile points in importance in the Pinto complex (Rogers, 1939, p. 50), do not occur in the Concho complex. Furthermore, projectile points from the two groups, though similar, are not identical. The Concho points are larger and more carefully worked. Probably these differences may be considered as an expression of the environmental diversity between the two areas concerned. While the pulper plane may have been employed in the dressing of hides, it is altogether possible that it was used in the preparation of certain plant foods which did not grow in the Concho area. Such an explanation for the absence of the plane implies in turn that there was greater emphasis on hunting among the Concho group than was practiced by the Pinto-Gypsum peoples.

Differences between the Concho and the San Jose complexes are primarily minor variations in projectile points. Typically, the San Jose points have an expanding base (see Bryan and Toulouse, 1943, Pl. XIX) which, though possible to duplicate in the Concho material, is not typical of that group. Even more significant are the similarities between these two groups, particularly since both lack pulper planes. It may be suggested that in contrast to the hunter-gatherers who produced the Pinto-Gypsum complex, both the San Jose and Concho groups depended largely on hunting for subsistence.

The basic similarities of the projectile points of the Concho complex to those reported from the San Jose and Pinto-Gypsum offer the best available means for dating these finds. The San Jose, a lithic complex found in certain old fossil dunes in the Grants, New Mexico area, approximately one hundred miles northeast of Concho, was considered by Bryan and Toulouse (1943, p. 272) as dating from the beginning of the deposition of the number 2 fill. This, in turn, was preceded by a period of erosion and formation of dunes. This period of erosion may be correlated with the warm, dry period known in Europe as the post-glacial optimum (Bryan in Haury, 1950, p. 125). It has been suggested previously that certain fossil dunes on which at least one of the Concho complex sites rests may also be correlated with this warm, dry period. Thus the typological and geological evidence are in agreement. Similar results are obtained when we review the present evidence for the Pinto-Gypsum complex. Ventana Cave is perhaps the most adequately dated site containing implements of this type. There Pinto-Gypsum artifacts (Amargosa II) occur somewhat later in what Bryan considers to be the number 2 fill but definitely after the warm, dry post-glacial optimum and well before the appearance of pottery using peoples in that area (Haury, 1950, pp. 294-7).

Evidence now seems to be accumulating that over much of the Southwest and during this general time level following the post-glacial optimum and preceding the appearance of pottery there existed many groups who used similar styles of projectile points, but who differed from each other in many minor respects. It is interesting that throughout much of this area these styles in projectile points were replaced by other basically similar types, i.e., the Basketmaker or San Pedro type point with triangular blade and corner notches (cf. Fig. 50 with Sayles and Antevs, 1941, Pl. XVI, and Guernsey and Kidder, 1921, Pl. 35, c).

Recapitulating the present data on non-pottery sites in the Concho area we note the following pertinent facts:

1) Over thirty localities are known in this area which produce projectile points and other stone artifacts but lack pottery.

2) Other sites are known which although producing materials similar to that recovered from non-pottery sites also contain pottery and other indications of later occupancy. These are considered to be early sites reoccupied at a later date by pottery using peoples.

3) Included in the non-pottery sites are three "blow outs" from which have been collected fluted points.

4) Parallel Flaked or Yuma points have been found in considerable numbers in other sites, always in association with points and other stone tools which collectively we have termed the Concho complex.

5) Sites of the Concho complex are the most numerous non-pottery sites in the area and contain, in addition to the Parallel Flaked points noted above, points which are similar to those reported from Pinto-Gypsum sites.

6) Completing the roster of non-pottery sites in the Concho area are several sites which have been identified as Basketmaker.

It is assumed, largely on the basis of typology that these non-pottery sites represent a significant span of time, from perhaps the close of the Pleistocene to just prior to the appearance of pottery in this area, or 500-600 A.D. It is not suggested that occupation of this area continued unbroken during this time but rather that the beginning of human habitation in this area dates considerably prior to the generally accepted Basketmaker-Pueblo horizons. Investigation of other likely localities in northern Arizona may be expected to produce similar evidence for early man materials in those areas as well.

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Museum of Northern Arizona
Flagstaff, Arizona
February, 1951

A BRAVO VALLEY ASPECT COMPONENT OF THE LOWER RIO CONCHOS VALLEY, CHIHUAHUA, MEXICO

J. CHARLES KELLEY

LOMA SECA (Chihuahua E7-5) was discovered July 23, 1949. It is an eroding village site located about one kilometer south of the Rio Conchos some eight kilometers southwest of Ojinaga, Chihuahua, Mexico. The site is located at the western edge of a large draw which intersects the valley of the Rio Conchos at this point. Physiographically the site occupies an eroding saddle at the foot of a high mesa which represents an outlier of the high gravel terraces of the Conchos valley. The mesa or butte lies just north of the site and separates it from the lowlands of the Conchos valley and at the same time provides protection from northerly winds. There is a thin scattering of hearthstones, flint chips, and artifacts over the eroding surface of the draw just west of the site. The alluvial floor of this draw is now cut by many small interbraiding arroyos. The lower end of the draw is the site of several *temporal* fields. It is a fair assumption that most of the alluvial flat of the draw over which the litter of camp debris occurs was at one time occupied by *temporal* farms which supplied much of the sustenance for Loma Seca. About a kilometer to the southwest, a large arroyo enters the Rio Conchos and must have provided a means of irrigation of the lowlands adjoining the site on that side.

The site is represented by scattered hearthstone charcoal, flint chips, animal bones, potsherds, and miscellaneous artifacts scattered over a roughly rectangular area which measures some 65 by 95 meters. At the eastern end of the site there is a midden of hearthstone and charcoal (Fig. 52, *a*, left center) some 3½ meters in height and about 4 by 7 meters in area. This pile of hearthstone and charcoal has several irregular shaped depressions in its surface. Judging by surface indications the the height of the midden is produced in part by erosion of the former surface to the present point, perhaps from one to two meters below the former level. Such middens occur quite frequently in sites along the Rio Grande to the northwest but their nature and origin are unknown. In the summer of 1948 a similar midden (Site 45C2-1) was trenched by the author and Donald J. Lehmer without producing any conclusive evidence as to its origin. The trench, which cross-sectioned a room-like depression in the surface of the midden, dem-

onstrated the presence of a dug-pit into which hearthstone and charcoal had washed, but revealed no trace of a prepared or burned floor, walls, or superstructure.

In addition to the large midden mound at the east, there are low mounds of hearthstone at more or less irregular intervals forming two or more parallel rows running lengthwise of the site (Fig. 52, *a*). Potsherds and other artifacts, together with lumps of burned clay showing marks of posts or *jacal* walls, are very common in these low middens. Examination of several of these reveal that they mark the location of house pits. The apparent erosion of the site indicates that the present middens may represent fill in the house pits when the surface of the site was a meter or more higher than at present. A relatively open area running down the center of the site along its long (northeast-southwest) axis perhaps represents a village plaza. Low eroded gravel hills delimit the site on the southeast and there is a scattered growth of mesquite and greasewood over the gravelly adobe soils on which the site lies. There are some traces of recent occupation, including several modern pits (Fig. 51, *a*) which may represent anything from treasure-hunter's pits to garbage pits and wells, although the latter guess is probably more nearly correct.

Pottery and artifacts of stone were fairly common among the surface debris of the site. The following artifact classes and types were identified from materials collected from the eroded surface:

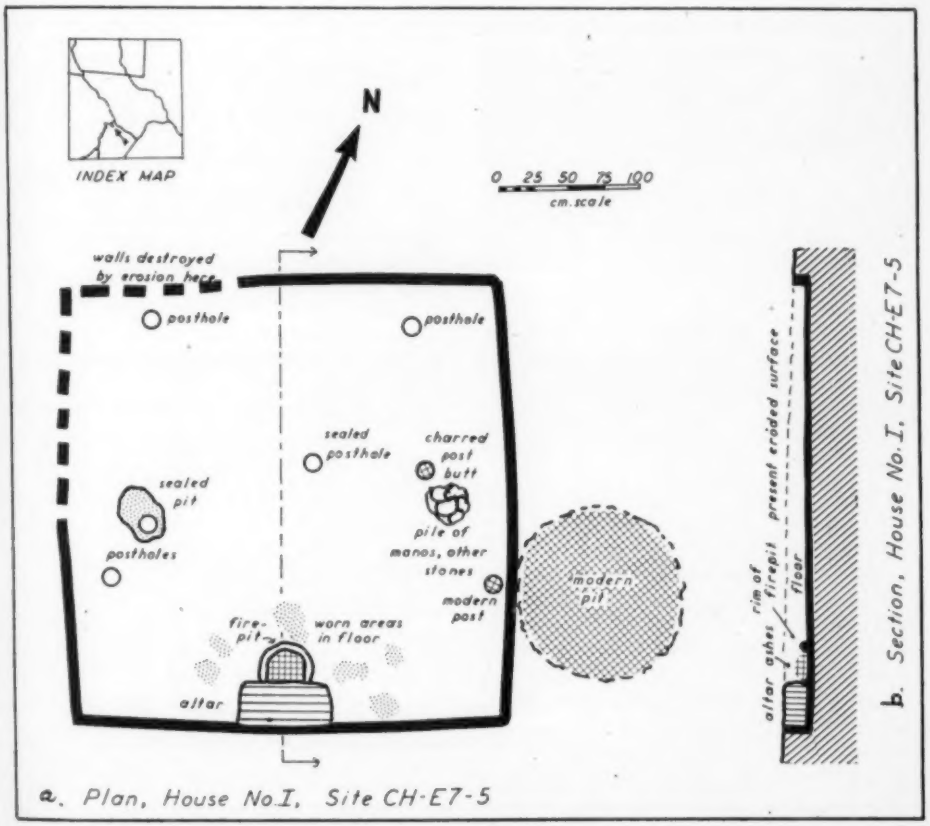

FIG. 51. Loma Seca. *a*, plan of house, excavated; *b*, southeast-northwest section through house I.

STONE ARTIFACTS

End-notched pebbles	8
Manos (one-hand, two-faced, ovate-quadrangular)	6
Ovate-rectangular stone shaped for mano usage, holes in each edge	1
Chopper (roughly chipped core, medium size)	1
Hammerstone (globular)	1
Flake side-scraper	1
Chipped spall (scraper?)	1
Perdiz Stemmed arrowpoint	1
Total stone artifacts	20

POTTERY

(Type identifications made in field)

	Sherds
Babicora Polychrome	11
Villa Ahumada Polychrome	1
Ramos Polychrome	3
Playas Incised (?)	1
Playas Plain Corrugated (brown with red rim and red band below corrugations)	6
Plain red-brown ware (Chihuahuoid)	8
Unidentified gray crackled ware	1
El Paso Polychrome (10 rim sherds, all painted; two direct, two thickened, two thickened-everted)	375
El Paso Ware undifferentiated, probably El Paso Polychrome (no rim sherds or painted pieces)	269
Total potsherds	675
Total artifacts	695

FOOD REMAINS

Mussel shells, opened	6
Charred fragments animal legbones	3
Corn cob, twelve row, small cob, charred	1
	10

HOUSE I

An unusually high concentration of potsherds and burned clay chunks with *jacal* wall imprints in the low midden adjacent to the large eastern midden and lying at the northeastern edge of the "plaza," led to further investigations at that point. Troweling revealed the edge of a burned clay-lined house pit underlying the midden. The edge of the pit was exposed by troweling on all sides save the northwest corner, where erosion of the site had cut the present surface below the floor of the pit. Then the midden debris lying in the pit was cleared away, leaving only the burned roof debris and artifacts lying directly on the floor. This debris was then carefully troweled and brushed away, exposing the floor, walls, and features of the pit.*

The house pit thus excavated was almost square, measuring approximately 3 by 3.2 m. on the longer sides (Figs. 51, *a*; 52, *b*). The walls were slightly convex outwardly. Erosion of the northwestern corner below floor level prevented determination of exact dimensions of northern and western sides. The maximum depth of the house pit when excavated was only 15 cm. but judging by the depth of other houses of this type previously excavated and by the evidences of extensive erosional denudation of the site the original depth may have been one meter or more.

The floor and walls of the pit had originally been lined with a thin (3 cm.) layer of adobe clay which had burned to a brick-like consistency in the fire which destroyed the house. In the northwest and northeast corners, set in slightly from the north wall, and some distance from the west and east walls, were conical shaped postholes, 25 and 30 cm. deep respectively, probably representing the site of major roof supports. These contained decayed wood and dirt at the bottom and charcoal near the top. The post in the northeast corner had slanted slightly inward. Two other posts set fairly close together, one in an irregular shaped sealed pit, were found just south of the center of the west wall. These may or may not have represented part of the roof and wall superstructure. Near the center of the room, slightly to the north of the east-west axis, was another hole in the floor that had

* The house was excavated by the author and Thomas E. James on July 23, 1949. The site itself was discovered during a reconnaissance of the greater La Junta area, particularly the Rio Conchos drainage, carried out in July and August 1949 by the author, under a grant from the Institute of Latin American Studies of the University of Texas and under a permit from the government of the Republic of Mexico. I wish to express my gratitude to all members and sponsors of the Institute, and in particular to the director, C. W. Hackett, and Donald D. Brand, whose interest and continued cooperation made the work possible. I also owe a deep debt of gratitude to Eduardo Noguera of the Instituto Nacional de Antropologia E Historia for his courtesy and continued cooperation in the obtaining of the necessary permits and the completion of the work. I would also like to thank Thomas E. James for his valued assistance and pleasant company during the first two weeks of the reconnaissance.

been sealed with adobe clay. The position and general appearance of this sealed pit conforms fairly well with that of the sipapu, or ceremonial spirit entrance, of the southwestern kiva. Just north of the east-west axis of the house and some distance from the east wall was the charred butt of a post 12 cm. in diameter resting in a slight concavity in the floor. This may have been part of the roof superstructure, the butt of a pole ladder, or the remains of some floor feature. In a somewhat similar house associated with a related ceramic complex on the Rio Grande near Esperanza, Texas, the only indications of the presence of roof support timbers were two similar charred post butts set in concavities on the floor in line along the eastern wall of the pit. These post butts had been held in place by plastering wet clay around them (Kelley, 1949). No such clay supports were found in the Rio Conchos structure. A single charred post butt was found on the floor, just northwest of the center of a pithouse at the Millington Site (Shafter, 7:1) on the Rio Grande just below the mouth of the Rio Conchos (Kelley, 1939). Not far from the southeast corner and directly against the eastern wall of the pit was a slightly decayed cottonwood post set in a hole in the floor. The lack of burning or significant decay of this post and its position relative to a modern pit (Fig.

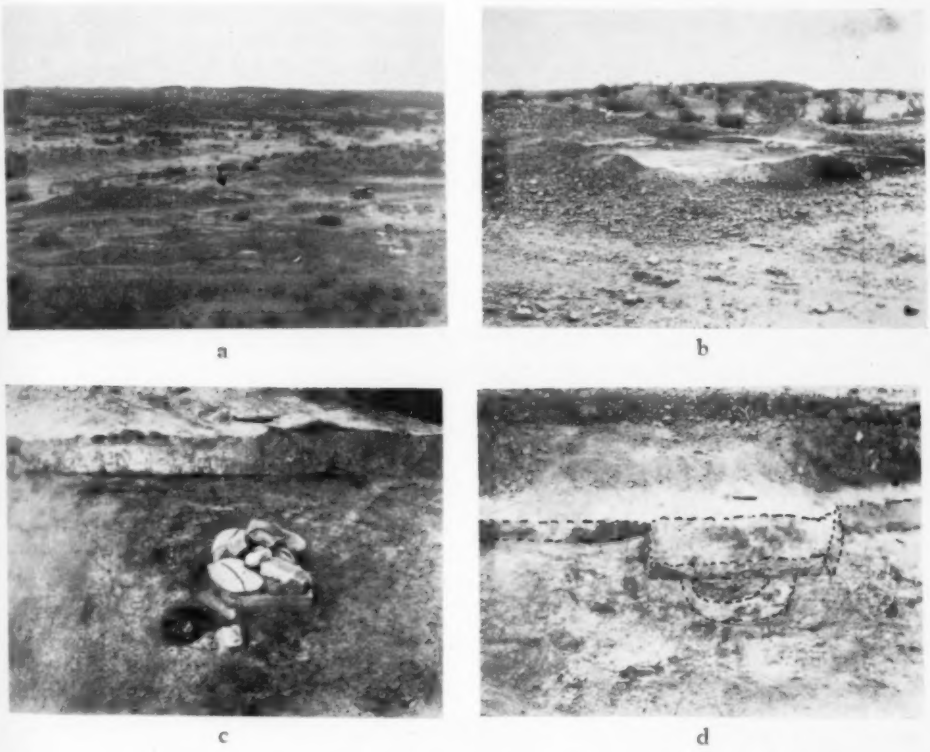

FIG. 52. *a*, general view of site from high mesa to the northwest. Large burned rock midden at left center. Arrow marks location of excavated house. Jeep in right midground indicates scale. Eroded alluvial flat of draw in mid-background has litter of campsite debris and probably was site of *temporal* fields upon which village depended for sustenance; *b*, view of house I, excavated, from northwest; *c*, eastern portion of floor and wall of house I. Dark spot in mid-foreground is charred post butt on floor. Note pile of manos and other stones at right of post; *d*, worn floor, altar, and fire pit (outlined with dashed line) at south end of house I.

51, *a*) suggests that this is a recent feature not associated with the original structure.

On the floor of the house lay a mass of intersecting and interwoven charred saplings and reeds, and broken chunks of burned adobe showing marks of criss-crossed reeds and saplings. This undoubtedly represents the former *jacal* walls and roof. If a heavier adobe or post wall structure existed above the level of the pit walls no trace of it was found. A somewhat similar house excavated at Site 57D2-3 on the Rio Grande near Redford, Texas, in June and July 1949 by the Anthropological Field Session of the Department of Anthropology of the University of Texas was found to have had durable walls of adobe built up at least some distance above ground level. These walls were constructed of turtle-back shaped adobe bricks laid up longitudinally and plastered together. The inside of the house was plastered and at least in places painted with red, yellow, black, and perhaps white bands.

Midway of the south wall of the pit there was a plastered adobe block or "altar," measuring about 30 by 65 cm., set slightly into the wall (Figs. 51, *a*, *b*; 52, *d*). The surviving feature was only about 15 cm. high but similar "altars" found against the south wall of houses at Shafter 7:1, and Shafter 7:3 on the Rio Grande were two or three times as high. The top of the altar is unplastered and conforms to the slope of the present eroded surface; hence, it is merely the basal part of the original structure. Discovery of this feature against the south wall of the house provides at least a partial answer to a question developed in the excavation of related sites on the Texas side of the nearby Rio Grande. There likewise all altars were located on the southern side of the house, but since the southern side was also the side toward the river it was impossible to say whether southern orientation or the position of the river was the controlling feature. Since the altar of the present structure is on the south side but away from either the Rio Grande or the Rio Conchos it would seem fairly certain that directional orientation alone explains the position of the features.

Against the northern face of the altar there was an adobe lined semi-circular fire pit with a raised plastered adobe rim (Figs. 51, *a*, *b*; 52, *d*). A thick bed of ashes filled this pit. In front of the pit and on both sides of it and the altar were irregular worn areas in the plastered floor. It should be noted that the sealed sipapu-like hole in the floor previously described was roughly in line with the altar and fire pit in a north-south axis across the main dimension of the house.

A few centimeters east of the burned post butt in the eastern side of the house there was a neat pile of seven stones on the floor (Fig. 52, *c*). These were fire cracked and discolored but still remained in place just as they had been stacked after their last usage. Included in the pile were three manos (one-hand, two-faced, shaped, ovate-rectanguloid), one peniform stone or light pestle, one unmodified moccasin-shaped nodule, one unshaped stone, and a fragmentary palette-like stone slab, which lay directly on the floor and supported the other stones.

The following artifacts were found on the floor of the house or in the fallen roof and wall debris immediately above it:

STONE ARTIFACTS

End-notched pebbles	1
Smoothed ovate pebble with concentric zigzag painted lines in black (atlatl weight or amulet?)	1
Manos (one-hand, two-faced, shaped, ovate-rectangular)	3
Peniform stone, or light pestle	1
Stone slab palette (?)	1
Moccasin-last (?)	1
Metallic rock, probably copper ore	1
Total stone artifacts	9

POTTERY

(Type identifications made in field)

	Sherds
El Paso Polychrome	7
El Paso Ware undifferentiated (no rim sherds or decorated sherds; probably El Paso Polychrome)	8
Total sherds	15

OTHER ARTIFACTS

Bison (?) bone hoes (?)	3
Charred checker-weave mat (individual leaf-elements about 0.8 centimeters wide)	2 fragments
Shaped mussel shell	1 fragment
Total miscellaneous artifacts	6
Total artifacts	30

FOOD REMAINS

Various fragments of large animal (bison?) bone and mussel shell.

CONCLUSIONS

The type of house with the associated altar and fire pit; the end-notched pebbles; one-hand, shaped, two-faced, ovate-rectangular manos; Perdiz Stemmed arrowpoints; together with village plan, maize, indications of *temporal* farming, and a high percentage of El Paso Polychrome pottery with associated lower percentages of Chihuahua Culture ceramic complexes indicate clearly that Loma Seca is a component of the Bravo Valley aspect and specifically of the La Junta focus of that aspect (Kelley, *et al*, 1940). There are no traces of the later Concepcion and Conchos foci of the aspect at this site and the component does not appear to have been occupied over a very long span of time.

The general trait assemblage, particularly the ceramic complex represented, suggests that the component was occupied between *circa* 1200 and 1400 A.D.

Excavation of house I at this site verifies previous generalizations regarding houses of the focus, and indicates that the location of the altar at the south end of the house is based on directional orientation rather than with reference to the location of the river. The appearance of a charred post butt on the floor renews speculation as to the existence of pole ladders in the houses of the focus. There is a suggestion of the presence of a sipapu, which is important and needs verification through further work. The heap of stones, including such household implements as manos, a moccasin-last (?), a pestle (?), and a palette or cooking slab (?), suggests orderliness of housekeeping and provides some indication of the range and number of implements used in a house. The absence of a metate is interesting. The presence of charred checker matting verifies the presence of this trait in the culture. The location of the site suggests that its occupants depended largely upon *temporal* farming for sustenance. It is possible that the abandonment of the site at about 1400 A.D. resulted from climatic deterioration which made *temporal* farming temporarily undependable or impossible as the principle source of subsistence.

The extent of the erosion of the site makes location of house pits and their excavation simple and speedy. Burning of the houses was apparently universal and promises a rich return in artifacts together with excellent preservation of house features. A small crew of men with adequate technical supervision could completely excavate the site in a few weeks time. Such an excavation would not only provide us with excellent supplementary information regarding house structure and artifacts but would likewise provide for the first time a complete village plan with streets, plazas, religious structures if any, burials, community hearths, storage bins, etc. The stage of erosion of Chihuahua E7-5 is such, however, as to demand excavation within the next few years if the site is not to be lost completely.

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THE ARCHAEOLOGY OF THE OLD STONE MILL IN NEWPORT, RHODE ISLAND

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THE ORIGIN of the old stone tower in Newport has been an important problem in the ancient history of American archaeology for something over a century. The argument swirls around two questions. Who built the tower? When was it built? There are two possible answers to the first of these questions; the second question can readily be answered if the first can be solved. Either the tower was built by persons unknown at some time in the pre-Colonial period; or it was erected in Colonial times shortly before it is first mentioned in the documents. And there is a shortage of the documents on this problem until the development of the nineteenth century romanticism. Either there was no interest or there was no problem. Up to about 1800, moreover, a clear line of legal documents traced the structure as well as the land on which it stood as belonging to Governor Benedict Arnold. The legal documents are supported by strong local tradition that the building was a stone mill. Specifically, in 1677, three documents, including Arnold's own will, mentioned the tower, and for the next 100 years other mention is rare. Thus, at the outset, we see that the controversy over the origin of the tower is recent.

There are evidently only two possible alternate origins suggested for the structure.

The simplicity of these two alternatives is hardly sufficient to explain the profound and even violent arguments which have raged around the structure for the past century and a quarter. The roots of the controversy may lie in the growing class consciousness in the area, and in the rise of interest in early explorations of the continent. This period coincided in New England with a concern in genealogy, and the invention of family trees. It was likewise the beginnings of the industrialization of the region, the proliferation of social classes, and the intensifying of class consciousness. It was to the advantage of newcomers to the area to claim a greater antiquity for the structure than the descendants of the early settlers would allow. Even today it is possible to predict, with considerable certainty, which opinion any local inhabitant holds of the tower's origin, if one knows the religion, ancestry and wealth of the individual.

Let us examine the controversy itself. Early speculation, involving theories about Phoenicians, Romans, and Druids, was so improbable that it gained little following. Not until the Norse sagas were studied in detail could even a possible, non-Colonial builder for the tower be discovered. This possibility was seized upon by some of the more romantic thinkers and trumpeted abroad. The first published connection between the tower and the Norsemen was made by Rafn in 1839. His monumental tome had a wide distribution to libraries and learned societies, but it was Longfellow, with his *Saga of the Skeleton in Armor*, who gave it popular recognition. The rise and evolution of the controversy between those who supported the Norse theory and those who insisted on the Colonial origin of the structure is ably covered by Means (1942), albeit with considerable bias. As of 1948, the battle could have been considered a stalemate, with perhaps the weight of evidence favoring the Norse theory, but the weight of authority favoring the Colonial theory.

Most of the support for the Norse theory lies part way between fact and fancy. Some of it is perhaps deliberate fraud, some merely misinterpretation, some wishful thinking.

The material used as evidence falls into three sub-categories: pictorial, documentary and hearsay. The earliest pictorial "evidence" is a map, published in 1634, by William Wood. In this, the Narragansett Bay area is rather inaccurately portrayed, but several islands are indicated in the approximate positions of Conanicut, Rhode, and Prudence. A settlement, marked "Old Plymouth" is indicated on the eastern shore of the Bay, at approximately the position of Fall River. Holand's (1946) claim that "It is exactly in the position now occupied by Newport," is unsubstantiated. From his interpretation of the map, he derives an elaborately reasoned theory which has no support other than his basic interpretation, which is probably in error. The second pictorial puzzle is an overmantle, now in the

possession of Lewis Gouverneur Morris of Newport, which can be dated 1740 from internal evidence. On this painting, the tower appears in the same state of ruin as it is today. However, close examination of the painting leads to a strong suspicion that the tower had been added at some later date. The color used is considerably sharper than the rest of the scene, and the brush-strokes of the hillside on which the tower stands continue under the smaller strokes which delineate the tower. Unlike the other parts of the painting, the tower is shown a considerable distance from its correct position.

Of the documentary misconceptions, the most puzzling is the Plowden Petition (1632), treated at length by Holand. The petition requested a grant from the Crown, of Long Island and part of the mainland, and mentions a "rownd stone towr." No location is given, nor are details mentioned. Holand's contention that this refers to the tower in Newport is difficult to believe. By no interpretation of the petition could Rhode Island be considered mainland adjacent to Long Island.

The information deriving from Governor Gibbs through Lossing (1855) is frequently cited by both Means and Holand as strong endorsement for the Norse theory. Several general points about this evidence must be kept in mind: (1) it was gathered at the height of the early Norse-Colonial controversy; (2) it was all second-hand and hearsay; (3) Gibbs was a strong supporter of the Norse theory, hence biased (Davis, 1847); and, (4) Gibbs was a local politician, and the political significance of the tower was as great then as now. His information falls into two categories: observation and hearsay. The observational points were: (1) that the tower had once been more extensively covered with mortar than it was in 1848, which is true but is of no great significance; and (2) that the foundations went to bedrock, which our excavation disproved. The hearsay evidence concerns the destruction of the top of the tower by the British, for which there is no other evidence; and a vague report that William Coddington, a founder of Newport, made inquiries about the origin of the tower. Means was unable to confirm the Coddington rumor in any particular, although it would have given strong support to his theory.

The preceding references are the direct evidence adduced in support of the Norse theory. Since they are not conclusive, the proponents have buttressed them with many dissertations from Norse saga material, elaborate analogies with circular structures, particularly circular churches, in the Old World, which are confidently assumed to be "prototypes" of the mill; and many discussions on the improbability of the tower having been built as a mill between 1675 and 1677. Practically all of the latter arguments fail if the structure had been built for some other purpose at some earlier period, say in 1657 when Arnold succeeded Roger Williams as President of the Rhode Island Colony, or 1663 when he became Royal Governor under the new Charter. During this latter period, he became the richest man in the area and built a fine stone house on Thames Street. If the structure were built for some non-mill purpose in this period, there is no reason for the discussions about Peter Easton's first-in-Newport windmill, built 1663, destroyed 1675. The change in time likewise removes the various objections to building it during King Philip's war. As for the Norse material, there is absolutely nothing to connect it in any way with Newport, nor with the southern coast of Massachusetts. The sagas are too vague to support any location of Vinland without conclusive evidence from other source. The most that can be said about the Vinland problem is that it is "not proved," and our excavations conclusively remove the Newport tower from the field of supporting evidence.

THE STRUCTURE

The outward appearance of the structure is more easily grasped by examination of a photograph (Fig. 53) than by a lengthy description, except that a note of caution on dimensions should be given. The columns to the projecting capstones are only 7′5″ high, the over-all height of the structure is 24′. In life it is less physically impressive than it is in photographs. Originally it stood a little higher above the ground than it does now: a part of the base of each column is buried in accumulated topsoil. The apertures in the structure, of which two appear in the photograph, present many of the points which have long been the mainstays of the anti-Colonial origin theory. The three largest openings,

called the windows, are double-splayed, with traces of a primitive wooden framework once mortised into the stonework. The four smaller openings which pierce the walls are scarcely large enough for gunports. The interior wall is likewise fretted with six niches or cupboards, six stair-tread holes, twelve beam holes, and an "altar slot" (Holand, 1946, p. 49, et seq.), and a ledge and notch into which fitted the three inch thick floor boards of the second floor above the arches. There is no corresponding provision for the lower floor. Finally, there is a high, arched fireplace drawn by two eight-by-six inch flues which let out on the surface of the tower a few inches below the present crest. Many architects and antiquarians have debated these items fruitlessly, and on visible characteristics the tower remains enigmatic. One has to go below ground to solve the problem.

One road to the solution was sought in an examination of the methods of construction which had been used in the tower. The Gibbs-Lossing report, already cited, said that the foundations went to bedrock. The report was finally proved false by our findings.

The method of building the tower became clear as our work progressed. A construction trench, varying in depth from nine inches to two feet from the original surface, had been dug in a circle to receive the column foundations. It was slightly more than seven feet wide. The outside line of the trench appears to have been close to a perfect circle, with very minor irregularities. The inside edge may have been scalloped inward to receive the footings or may have been irregular. This line was very hard to identify in the restricted space between the columns. Into this trench were tumbled, more or less haphazardly, eight piles of rocks of varying sizes. Some attempt was probably made to line up a series of larger slabs on the inside edge of the proposed columns to form the major column supports. Very little pattern is evident in the arrangement of the other foundation stones. The material used was largely tabular: slate, schist and the like, so that most of the foundation

FIG. 53. The Newport Tower, looking north, April 1951.

stones tended to lie flat when thrown into the trench. The material differs in no major respect from the "rocky field stone" mixture in the tower itself, but some of the rocks are larger than any that appear in the structure above ground.

These foundations were then capped over with a layer of mortar, probably as a means of leveling them up before beginning the construction of the columns. It must have been necessary to fill in the construction trench before the above-ground building was begun, for the foundation stones were not mortared or fitted in any way. Apparently this refilling was done before the foundations were capped with mortar. Excavations on the inside of several columns disclosed that the yellow-olive clay which refilled the construction trench, as well as a very thin layer of loam, actually covered part of the foundation stones before the mortar cap was poured. In one place, under the west column, these layers were preserved intact: the plaster cap above, conformably under it a thin layer of loam, and below that a layer of yellow-olive clay which rested on the top foundation stone. On these prepared mortar surfaces the columns were then built, the stones perhaps roughly shaped after setting, and the drum then plastered.

Before the current excavation, there existed no worth-while record of previous digging at the site. A third-hand report in 1848 mentioned some treasure hunting in 1797 (Brooks, 1851), and logical inference from the city records concerning the Christmas illumination of the tower in recent years indicated the laying of wires, but no detailed record was kept. Although the structure had been guarded by the city fathers since 1855 when the area became a public park, there is only the briefest record of the restoration and repairs made by George C. Mason, Jr., in 1885. The extent of these can only be inferred from a study of photographs and examination of the stonework. The diary of Frederick Mackenzie mentioned earthworks in the region of Revolutionary War date, and a letter (quoted and misinterpreted by Means, 1942, p. 47) in the Providence *Gazette* of May 14, 1823, suggested that traces of earthworks were still visible at that time. Today, all that remains is a mound behind the house once owned by Governor Gibbs, some distance away, which is probably the last vestige of this construction. No clue to the origin or use of the tower existed other than the appearance of the structure itself, and such things as lay under the ground yet to be discovered.

THE EXCAVATION [1]

On the advice of a committee of the Society for American Archaeology extensive excavations were made in 1948 and 1949.[2] Many of the pro-Colonial (Arnoldist) supporters were violently opposed to any and all digging. The first excavation, carried on at a considerable distance from the tower, produced a spate of repetitions of the oft-quoted "proofs" of the tower's origin, coupled with exhortations to "cease this needless waste of money immediately." In spite of this, the findings of the excavations confirmed their contentions, although what effect these conclusions will have on the ultimate outcome of the controversy cannot yet be seen. A preliminary examination of the area revealed a series of comparatively recent obstacles to excavation: wood and concrete benches, cement walks, large elm trees, and a protective iron fence. Most of these could not be disturbed. Further investigation raised considerable doubts as to the structure's stability were its foundations to be weakened. Therefore, it was resolved to begin excavation well away from the tower. Several additional considerations reinforced this decision: (1) we might be able to determine the strength of the underpinnings of the tower through a study of the geology of the area; (2) we might find traces of some related structure, or some cultural stratigraphy. With these points in mind, the maximum possible trench was laid out in such a way that its prolongation would pass between the columns of the tower. The

[1] A complete report of the excavation is in preparation. Whether published or not, this will, on completion, be on file in the Harvard archives and in the Peabody Museum library.

[2] The Committee was composed of J. O. Brew, Chairman, Hugh Hencken, Philip Phillips, Junius Bird, S. P. Moorehead, and Frederick Johnson. Hencken paid regular supervisory visits to the excavation, and the other Committee members visited the diggings at least once during their course. The excavation was sponsored by the Preservation Society of Newport County, and was conducted with the approval and cooperation of the Newport Park Commission.

trench was finally located along south-south-east to north-north-west line because it afforded the fewest obstacles.

This trench garnered few artifacts, in contrast to the quantity later found in the immediate vicinity of the tower. Topsoil averaged about a foot in depth, below which was undisturbed clay. No trace of any structure was found, no large tree roots, and only one possible posthole. This was at a considerable distance from the tower, almost exactly on the centerline of Touro Park, in which the structure is situated. A map of this plot of land, made shortly before it was bought by the city, shows it cut into building lots. A central fence divided the lots facing Mill and Pelham Streets on the two longer sides of the park, and the posthole is probably from this fence. This supposition is partially confirmed by our find of the remains of a gravel walk, six inches below present ground surface, passing over the posthole. This gravel walk shows clearly in the earliest known photograph of the tower, dating from approximately the time when the park was first laid out. Earlier material, pottery fragments and other objects, were unstratified in the thin layer of loam below the gravel walk. It seemed as if the area had been scraped level before the park was laid out, and that the scraping had removed many of the earlier deposits and confused the remainder.

The immediate vicinity of the tower showed an increase in data from the excavation. As more and more material was gathered, the rate of excavation slowed. We lifted one section of the sidewalk surrounding the tower. This was, perhaps, the most crucial moment of the season for the Norse supporters: they were sure that the remains of a round church ambulatory would be found in the region entombed under concrete in the Gay 90's. Unfortunately, the Victorians built well and solidly, with a nine inch sub-base of crushed granite, removing all but a very thin layer of topsoil before the concrete of the path was laid. We cleared the area with great care, but found the yellow clay, as before, completely undisturbed; no sign of foundations, no postholes, no Norse artifacts. A slight disturbance on the inside edge of the path confirmed the previous location of small shrubs, which appeared on photographs taken by Means during his study of the tower. Inside the shrub line was a second line of disturbances: the postholes in which are the heavy granite supports for the iron fence, which has supposedly been standing since the 1860's. Our trench continued under the fence, and into the immediate precincts of the tower.

The trench through the center of the tower laid bare a sequence of events which permitted only a limited interpretation. In one pit in our preliminary trench, we found that the bedrock in the immediate vicinity of the tower is 7 feet 4½ inches below the surface. Overlying it is a layer of blue clay of glacial origin, almost as hard as the rock itself. Over this is a second clay layer, lemon yellow in color and softer in consistency than the underlying blue layer. Above this, is loam containing continuous deposits from Colonial times to the present.

At three points on the inside of the columns we detected what were probably the remains of an original gravel floor. This was from one-half inch to 2 inches over the yellow clay and no more than a quarter of an inch thick at its best preserved point. The condition of this level was so fragmentary that it was impossible to trace its continuity for any distance, or to isolate the material which may have been in position under it. In all but one case it was identified only after very careful examination of the trench wall, and not found during the course of the digging. We thus confirmed, however, a layer of brown earth under the earliest floor, probably continuous with the brown earth under the caps of the column foundations. Since this material was not isolated in the digging (it was smaller than the minimum section), it is impossible to say that this floor had Colonial artifacts under it. But it is significant that the lowest levels had nothing but Colonial material, and that the lowest levels were in place, at least in part.

The next level identified was that of the lip of a pit in the southwest quadrant of the area within the tower. Its eastern edge was overlapped by a later pit, of which there is historical record. The earlier pit, which was named the "Barbecue Pit" during excavation because of the quantity of bones and charred wood found in it, can be dated from the early to middle part of the 18th century, on the basis of pottery and clay pipe stems found in the refilled material. The refilling of this pit was rather haphazard: the material was not consolidated, and at least three unsuccessful attempts were made to restore it to grade.

The most extensive excavation in the area was the "Treasure Hunters' Pit" in the center of the tower. The historical record of this pit is supplied by David Melville in a letter to the *Newport Herald* of June 17, 1847 (Brooks, 1851, pp. 22-38). To support one of his arguments in a violent controversy which was then raging in the press, he stated: "Once in the year 1797, . . . excavation was made in the night time by a company of *money diggers*, directly under the center of the ruin, which was left open, and about four or five feet deep." Our findings confirmed the existence of such a pit, but the material with which it was refilled does not confirm the date. There is some suggestion, however, that the center area had two pits superimposed one on the other. This was not known at the time, and we failed to keep the refilled material from the two pits separate. If there were two such pits, the earlier may have been that of which Melville wrote. The second pit is more important at the moment. Concurrent with it is the only definite soil separation—I will not dignify it with the name of a floor—which we were able to detect. This was found practically everywhere within the circle of the columns. In most places it was marked by traces of charred wood, and even where the charred material did not appear, there was a line in the soil and a detectable difference in the quantity of fallen plaster above and below this line. Charred material was also found on the sides and floor of the treasure hunters' pit, so we can assume that the pit was open at the time of the fire. In association with the charred material were many bricks, which have not yet been dated. Whatever the date of the fire, it was not sufficient in extent to indicate a burning of the tower, unless most of the tower's wooden structure (two floors, stairway, roof) had been previously removed. No clues to the type of woodwork burned could be found in the remains. One beam with a nail projecting from it was found, but the other charred traces did not show any recognizable pattern.

The refill of the treasure hunters' pit cannot be earlier than 1840, for it contained blue willow ware of that date and other mid-19th century pottery forms. The pit was refilled to the charred level, which is only four inches above the earliest floor traces mentioned above. On the basis of the finds in the treasure hunters' pit, I would connect its refilling with the period when Touro Park was first laid out in 1855. This agrees rather well with Catherwood's measured plans of 1837 (Means, 1942, Fig. 31), which show sixteen inches of the northeast column drum exposed. The amount of accumulation seems to have been remarkably slow during the 18th and early 19th centuries, suggesting that there was not much activity around the structure.

One other "floor level" was identified in section, but no date could be assigned to it. No artifacts were associated with it which would set it off in the span of the late 19th century. We know, however, that rather extensive repairs were made to the tower after 1878, when a heavy growth of ivy was removed, and this level may well be the working level of that period.

Between ten and twelve inches below the present sod surface there is a layer of light grey clay. Earnest Leal, who is in charge of the maintenance of the park, told me that "several" years ago (he was not quite sure when) he had dug out the center of the tower. This area had collected a heavy concentration of pigeon droppings. He replaced it with grey clay "so that the grass could grow again." In spite of Mr. Leal's lack of precision about the date, I feel it is safe to correlate this deposit with some time between 1930 and 1948.

At the conclusion of the 1948 season, Leal again added to the topsoil within the tower "to improve the drainage." In 1949 this top four inches of loam was identified.

The sequence found thus adds one foot of increase to the surface within the tower within the last 10 to 20 years, as compared to 11 inches for the previous 250 years. There is no doubt that much of the recent addition has been due to increased interest in the tower, and the consequent extra attention which has been lavished on the park by the superintendents. There is also to be considered the gradual consolidation of the soil by the increasing overburden. But this difference seems rather extreme, and difficult to account for. The stratigraphical evidence appears to be complete, however, and absolutely no sign of an extended chronological gap was found.

The sequence of events thus enumerated yields clues to two general locations in which significant finds could be made to date the

tower. In the first place, it was necessary to refill the construction trench before the lowest stones of the column drums were put in place. This refilling was essential to hold the unfitted foundation stones in place in order to support the columns. Anything in this refilled material must antedate the tower. Secondly, there was a line of brown loam passing under the mortar cap in at least one place. In two more places it passed under some of the column stones, suggesting that here the cap had disintegrated. Finds in this lowest loam layer would have to be contemporary with the structure. A third possible source of information, which unfortunately yielded nothing, was the mortar cap itself. Objects trapped in it, unlike objects embedded in the plaster elsewhere in the tower, would have to be contemporary, since there would be no way to introduce them at a later date.

Finds in the crucial areas outlined above were not numerous, in fact they were surprisingly few and far between. It is difficult to imagine that the construction trench, considering its magnitude, would not have trapped more of the contemporary culture than it did, but one must remember that the tower was not near the early settlement, and the refilling of the construction trench took place *before* the rather extensive labor necessary to build the structure itself. However, some of the material caught in it during the filling may have been discovered in our investigation, but rejected as doubtful. In the course of the centuries that the tower has been standing, it has been a focal point for treasure hunters. Consequently, the area is pitted and fretted with innumerable holes. While these holes can be easily seen in vertical section and their contents removed separately during excavation, it was necessary to reject as evidence any material which came from areas which might possibly have been contaminated. Because of this, it seems advisable to discuss only such evidence as was discovered in position, studied there, photographed, and removed under supervision so that there was not a chance of an error. Another group of finds, undisturbed in the upper levels of the construction trench, are of no value for dating. Among these are fragments of plaster, nails and spikes which were so badly rusted that their shape and details cannot be discovered, and some animal bone fragments. The last mentioned might be datable by the radiocarbon technique, but the inherent limitations of this method indicate that it would be of doubtful value in this case.

THE FINDS

It remains, then, to examine the potentially datable finds made in locations unquestionably contemporary with the construction of the tower. The earliest deposit in point of time was in the trench passing between the northeast and east columns. This trench, which showed a shallow, late disturbance inside the tower, showed no irregularities in the refilled area outside the line of the columns. We were thus able to identify clearly the outside edge of the construction trench at a point very close to its upper limit, and to photograph it in color. Several other trenches through the arches had already been completed, and considerable difficulty had been encountered in identifying the inside edge of the construction trench. It was, therefore, decided to dig this trench in smaller sections, in an attempt to identify the construction trench edge where it crossed the intercolumnar space. It was also decided to leave unexcavated a portion of the outside edge of the construction trench, to be excavated later with the hope of finding on the trench side or bottom some traces of the tools or methods used in its construction. A previous excavation had indicated that such results might be forthcoming if the work were done with sufficient care.

In both of these endeavors we were partially successful. The inside edge of the construction trench was discovered, and found to be an irregular line, not a near-perfect circle as was the outside edge. When the time came for clearing out the unexcavated trench edge, we discovered a trace which obviated any idea of attempting to find tool marks.

In the soil sequence given above, it was indicated that the material underlying the loam was a layer of glacial yellow clay. On contact with the air, this oxidizes slightly to a darker color. The refilled material of the construction trench is yellow-olive in color, and slightly looser in consistency than the undisturbed yellow clay. It is thus easy to distinguish them, once the approximate line of the break is known. If the line is not known, it is possible to miss the distinction because of the

tendency of the yellow clay to smear over the working surface, carried on the edge of the tool in use. In this case, the outside edge of the construction trench was known and already photographed, so there was no possibility, with the care with which we were excavating, that it would be missed. Consequently, when we found an irregularity in the outer bottom surface of the construction trench, which had otherwise been extremely regular, we investigated it with extra caution. The irregularity turned out to have the outline of a footprint, toes pointing to the north, the heel more deeply impressed than the toes. The outline was slightly blurred as if by the accumulation of clay on the boot at the time the impression was made. The boot appeared to be about size eight, with a large, square heel and a rather broad toe. The impression was photographed and a plaster cast made of it before the excavation was resumed. Under the footprint, into the yellow clay, was a narrow slot filled with brown loam. There was no chance of mistake: the boot footprint had been covered with the yellow-olive of the construction trench; the yellow clay lay under the slot, and between the two yellows, the brown loam was very clear. In this brown loam several objects were found: two very small fragments of a clay pipe; one a small plain bowl fragment with no datable indications, the other a piece of pipestem, with a trace of a beaded band. The decorated portion is so small that no expert has yet dared to commit himself on a possible date, but decorated pipestems were common in the 17th century, and several dated examples bear a slight resemblance to the beading on this crucial piece. Other fragments in this slot consisted of a badly rusted nail and several bits of plaster. The slot in which these objects were found was ten inches deep at its maximum point, and about two inches wide. It appeared to have been made by a careless pick-stroke, and subsequently tamped in before the refilling of the construction trench. Inasmuch as the construction trench material over the trace was undisturbed and continuous to the foundation stones of the adjacent columns, the conclusion is inescapable that this deposit either antedated or was contemporary with the construction of the tower.

A second group of finds was more conclusively datable, and equally certainly contemporary with the construction of the tower. In a trench through the arch between the south and southwest columns there was likewise a disturbance of later date inside of the column line. In this case, however, this later pit was inside the inside edge of the construction trench toward the tower center, so that both the inside and the outside edges of the construction trench were clear and undisturbed. Excavation by levels had proceeded in the normal way over the whole length of our trench until it was discovered that the builders had dropped a rather large stone in the center of the intercolumnar space. To enable the work to proceed more rapidly, one of our workmen was put to work excavating the trench inside of this obstruction, another outside of it. This left a dike of earth connecting the two columns across our trench where the stone lay. After the outside and inside pits were completed, my assistant and I set to work on either side of this dike, hoping that something might turn up in position. The first find consisted of a nail, badly rusted, but unmistakably in the yellow-olive clay of the construction trench fill, with no sign of later disturbance. On the opposite side of the dike a fragment of pottery was found under identical conditions. Both of these finds were carefully recorded in position before removing them. In the dike between these finds, another fragment of pottery and a small, triangular piece of glass turned up. The nail, the glass fragment, and one of the pottery fragments were not datable. The other pottery fragment retained a small area of glaze on its outside surface, and clear marks of the interior surface treatment. The ware had an orange paste, with a brownish glaze decorated with small irregular purple specks. J. C. Harrington examined this fragment, and stated that similar examples had been found in Jamestown, Va., which could be dated to the last half of the 17th century. The style, however, continues through the 18th century, and does not, therefore, afford a close check to the construction period. It does, however, prove that the construction trench could not have been dug *before* the 17th century.

It was indicated above that a brown earth or loam layer was discovered in several places passing under the stones of the columns themselves. In the point where this was most clear, and the mortar cap to the foundation stones still in place, there were no identifiable arti-

facts in the earth layer directly under the column drum. However, in other places we were more fortunate. At the base of the southwest column, we found a two inch thick layer of brown earth extending eight inches under the edge of the column, trending slightly downward as it projected under the stones of the drum. To observe this earth, we removed several loose stones at the column base, but it was impossible to tell whether they were the topmost foundation stones or the lowest stones of the plastered drum. In the brown earth, protected in its position by one of the stones which we removed, was a small gunflint and a fragment of plaster. These objects were in the brown earth under the edge of the column. There was no trace of an animal hole, root, or other disturbance. The objects could not have reached the place where they were found except at the time of the building of the tower.

A similar situation existed under the east column. Here the mortar cap to the foundation stones had partially disintegrated, and several of the foundation stones were loose and were removed. A small opening into the base of the column under the lowest of the drum stones was revealed, and into it I was able to insert my forearm horizontally to the elbow. It was impossible to see into the area, but the material which I removed appeared to be fragments of the disintegrated mortar cap and brown loam. From this area I extracted another fragment of a clay pipe, again, however, too small for dating.

Individually, these items may appear insignificant. Collectively, however, they are conclusive. One find, or two, might be the result of faulty excavating technique. Many finds, documented and carefully observed, excavated under circumstances which in each case preclude error, add up to a positive and unshakable conclusion. The tower could not have been built before the latter half of the 17th century. The Norse theory can no longer be entertained.

CONCLUSION

What, then, was the history of the tower? In previous sections of this report I have discussed the sequence of archaeological findings. From them approximate dates can be derived for some events, but for others the evidence does not illuminate the picture. Knowing that the structure was built after 1639, a sequence of its history can be reconstructed from archaeology and documents as follows:

Probably before 1675: Construction of tower, with basic stone features as now appear.[3]

Between 1675 and 1677: Conversion of tower to mill by addition of machinery and millstones.

1677: "ye Stone Mill" in deed to the Jewish Cemetery.

"stone wind mill" in record of death of Damaris Golding.

"my Stone Built Wind-miln" and "my Stone-built Wind-Milln" in Arnold's will.

1741: "an Old Stone Wind Mill" in the will of Edward Pelham.

In confirmation of this mill phase, we found five fragments of two millstones. The largest was in the "Barbecue Pit" which we dated to the early 18th century. The original diameter of this stone was calculated at 54 inches. There are also second- and third-hand accounts of corn being carried to the Mill to be ground.

1767: "Old Stone Mill some time past used for a powder house," in the will of John Bannister.

1776-1779: British occupation of Newport, fortifications around the tower, possible use as a powder magazine.

1797: At some period before this date, the barbecue pit was dug and refilled. According to David Melville, in this year the "Treasure Hunters' Pit" was dug.

1821: Governor Gibbs is reputed to have held his inaugural reception in the tower (Clarke, 1910). For this occasion, a floor would have to be built, and possibly other repairs made to the tower. Our excavations discovered at least four holes on the inside edges of the columns, possibly for receiving posts to support this floor. Fill corresponded with that of the treasure hunters' pit, which may have been left open under this floor, and not filled until later. There are no indications of upper stories or roofs of this date.

1855: Tower acquired by the city, park laid out, wooden fence built. Before this time, the windows had been bricked up. This must have been done at some time before 1837

[3] In this year the *first* Newport *wind*mill was destroyed.

(Catherwood's drawings show the windows closed). Ivy was planted about this time. Land around tower leveled, pits under tower filled to grade.

Between 1867 and 1873: Wooden fence replaced with present iron fence.

1885: George C. Mason, Jr., completed restoration of the tower. Ivy and window bricking removed, top of wall and serious cracks patched. Possible traces of a work floor at this level.

From this time on, the tower preserved its mystery until the beginnings of our excavations in 1948.

This brings us to the initial and final problem: what did the tower look like originally, and for what purpose was it built? All known pictures of the tower, from the earliest toward the end of the 18th century, to modern photographs, show it as essentially unchanged. Our excavation showed that the level of the ground around it was once lower by almost two feet, and the earliest floor level suggests that originally the tops of the foundation stones were exposed several inches above the ground. Here, then, would be a major change in the appearance of the structure, but one which would disappear rapidly with the accumulation of soil, bushes or grass around the column bases. (The oldest pictures show the bases of the columns obscured by grass or hay.) The general impression received after extensive study of the foundations is that the builder put together on this barren hilltop several piles of artificial bedrock in a ring and then erected on its top a medieval structure.

The picture thus created is of a rather peculiar, anachronistic tower, owned by Governor Arnold, situated on the highest point of his land and connected to his house by a path, on the midpoint of which he laid out a grave for his favorite granddaughter, Damaris Golding, when she died in 1677. From this, it might be inferred that it was a path frequently traveled by the old gentleman. The structure itself had a fireplace, a writing-desk (the "altar slot" conforms closely to the height of the style of writing desk in use until the end of the 19th century), and three windows. The windows face the three sea approaches to the town, but they also face Arnold's main landholdings. He was very proud of his property, as his will clearly shows. The lower floor of the structure was perhaps equipped with large doors, which could be opened on fair days, and closed during a storm. A hearsay report says that it was so equipped in the early 19th century. The picture thus recreated differs in no appreciable degree from one of a summer-house, or "folly," a form of architecture which soon became very popular.

Before Arnold's death, the tower probably was converted to a windmill for grinding corn. The innumerable references, and the fragments of millstones confirm this. If the conversion were a magnanimous gesture on Arnold's part, he would hardly detract from his virtue when writing his will by saying why the tower was originally built. By that time, he was probably getting too old and feeble to use it as it had been originally used.

I suggest, then, that the tower was built as a comfortable retreat and lookout for a very rich and very autocratic old man. Certainly, it was not built by the Norse.

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A CURRENT SYNTHESIS OF NEW YORK PREHISTORY*

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SINCE MY SYNTHESIS (Ritchie, 1944) additional chronological and other data (Smith, 1950; Bullen, 1949) have accumulated for the New York area from interrelated field (Ritchie, 1946; also excavations of 1950 on same site) and laboratory (Ritchie and MacNeish, 1949; MacNeish, n.d.) researches. Among the significant sites recently excavated by the writer, which have contributed to the problem of cultural continuity are the Jack's Reef site, to be further excavated and reported on in 1951; the East Sugar Island site (Ritchie, 1949, pp. 3-24); and a group of Owasco and early Mohawk sites in eastern New York, excavated in 1949-1950 (Ritchie, Lenig and Miller, n.d.; Ritchie, n.d.). The Piffard site in western New York, excavated by Robert R. Hill of Rochester, N. Y., is another site showing transitional features. The chronological data accrue from the radiocarbon analyses of Arnold and Libby (1950, p. 7) made from charcoal samples obtained from hearths and graves on certain Archaic and early Woodland period sites in central New York.

The Archaic I period (Fig. 54) was represented by the lower component (Lamoka Lake 1) at the Lamoka Lake site, Schuyler County (Ritchie, 1932), which was dated at 5383 ± 250 years of elapsed time. Charcoal obtained in the writer's excavations of 1925-26 was not submitted. The samples used (288, 367) were excavated by A. Frank Barrott of Elmira, N. Y., at the request of the writer, from an adjoining portion of the site corresponding in all respects to the earlier explored area. Since sample 288 was found to be root contaminated the dating was based upon sample 367. At Frontenac Island, Cayuga County, the particular hearth (Ritchie, 1945, Pl. 15; cf. pp. 6-7, 57) yielding the charcoal used in the analysis (sample 191) directly overlay and partly destroyed what appeared to have been an extended burial, a Laurentian characteristic, suggesting that both features may pertain to the early Lamoka-Laurentian contact stage of occupation (Frontenac Island 2 component) at the site (Archaic III, Frontenac focus). The dating is a little later than Lamoka Lake, namely, 4930 ± 260 years B.P.

Unfortunately, no radiocarbon dates have as yet been obtained for a site of purely Laurentian character (Archaic II). However, if we accept the Frontenac Island figure of 4930 ± 260 for the approximate beginning of the Laurentian phase in central New York and 2948 ± 170 years (sample 192) for the early Woodland II in the same region, a temporal span of nearly 2000 years for the Laurentian in this part of its range may be postulated. A duration of this order would seem in accord with the very numerous and widely distributed sites, most of them surface spreads, which have produced the large majority of the earlier industrial remains not only in central New York but over the greater part of the state.

Constantly accumulating evidence clearly reveals the Laurentian as an intrusive manifestation into the northeast from lower Canada and suggests that in New England and eastern New York, where the Lamoka is absent, it at least in part coexisted with the latter. Its indicated relationships with transboreal cultures are discussed by Spaulding (1946). Everywhere the dominant early cultural phase in the northeast, the regional and temporal manifestations of Laurentian are now becoming more evident through excavations over a wider area (Ritchie, 1940; Ritchie, Kirby and Shafer, n.d.).

In littoral New York, New England and New Jersey, it formed the unequivocal basis of the Coastal phase of culture. Attenuated Laurentian traditions persist with various modifications, probably due both to local independent developments and to diffusion, down to historic times in some localities (Ritchie, 1944, pp. 102-6; Smith, 1950). The Laurentian tradition survived in the stone industries of the cultures of the Windsor aspect (Coastal phase), appearing latest in the Sebonac and Niantic foci of eastern Long Island and southern Connecticut, respectively. The Laurentian may also be basic to the later cultures of Maine. In the writer's opinion

* Based on a paper given at the Fifteenth Annual Meeting of the Society for American Archaeology, at Norman, Oklahoma, May 19, 1950. The actual carbon 14 dates have been added. Cf. Ritchie, 1951.

there is evidence that these stemmed from an early Laurentian tradition seen in certain Quebec (Speck, 1916), Labrador (Strong, 1930), and Maine stations (Kingsbury and Hadlock, 1951). Specific resemblances in projectile point types suggest that the "Red Paint" culture of Maine may be a localized and specialized later development of this basic manifestation, with emphasis on a mortuary cult. Subsequent changes in the "Red Paint" complex, including the addition of dentate-marked, rocker-stamped, and cord-decorated pottery, probably introduced by a new population movement across lower Canada, appear to have been responsible for the cultural manifestations recorded in many of the later shell heaps of the area (Ritchie, 1949, p. 48). The grooved axes found in sites of the Windsor aspect probably represent diffusion from later Archaic sites of the southeast. While fully grooved axes predominate on Coastal sites in New York, three-quarter grooved specimens occur. The latter type is reported from only a few Archaic sites in the southeast and may have appeared somewhat later in time in this area (Claflin, 1931, pp. 29-30; Webb, 1950, Table 4; Webb and Haag, 1947, p. 30). It is from this quarter, too, at a still earlier period of Laurentian history, that there were probably derived the simple forms of the bannerstone which have a wide but uneven distribution in the Laurentian and early Windsor (Smith, 1950) manifestations but are negative Lamoka traits. The bannerstones embrace rectangular, trapezoidal, oval, spheroidal and crescentic or winged forms. While the former types have closer parallels in the Archaic of the southeast, winged forms are not unknown there, being present in sites of the Savannah River focus in Georgia (Claflin, 1931, pp. 28-9; Fairbanks, 1942, p. 228) and recently reported from the upper level of a typical Kentucky shell midden (Webb, 1950, pp. 316-8, 348). Judging in terms of distribution, a center of dissemination of the crescentic variants in the middle Atlantic Coast area seems not unlikely.

Problems involving the source and direction of diffusion of the ground slate ulo and double-edged knives and lance heads of the Laurentian phase are greatly elucidated by the new radiocarbon chronology. These traits were absent in the presumably earliest Eskimo manifestation, the Ipiutak of northern Alaska (Larsen and Rainey, 1948, p. 155), dated at about 973 ± 170 years B.P. (Arnold and Libby, 1950; p. 12). The probably later, but still undated Dorset, the first known Eskimo culture in the eastern Arctic, also apparently lacked the ulo but possessed several forms of the ground slate point. The case for the primacy of the ground slate industry in Laurentian would thus seem to be established both by distributional and temporal factors (Ritchie, n. d. [a]).

In the New York area there existed a still poorly defined stage of transition between the cultures of the late Archaic (Archaic II and III) and Woodland periods. Certain Laurentian-Frontenac traits carry over into early Woodland I times, for example, the single-barbed bone point with basal line hole; conical antler projectile point; deer scapula scraper (continued from the Lamoka focus); thick, broad-bladed, side-notched projectile points; ovate and triangular end scrapers; and expanded and side-notched, expanded base forms of the drill. Gone, however, are such diagnostic Laurentian-Frontenac traits as the gouge, plummet, bannerstone, chopper, ulo, etc.

For the first time there appear such characteristic elements as extremely broad-bladed "heart-shaped," and semi-lozenge-shaped points and knives, and steatite vessels, all having specific affinities with eastern Pennsylvania and lower New England. Many of the knives seem intentionally asymmetric. The materials are often rhyolite and jasper, derived unquestionably (like the steatite) from southeastern Pennsylvania where a similar assemblage characterizes the same time zone (Witthoft, 1949, pp. 10-11). A recognized marker for this horizon is Vinette 1 pottery (Ritchie and MacNeish, 1949, p. 100) which occurs widely but thinly scattered throughout the area both inland and on the coast (Smith, 1950, pp. 135-6).

Recognized markers for the early Woodland II period comprise Vinette 1 pottery; blocked-end tubular pipes; straight and faintly bent plain pottery and stone pipes; tubular copper beads; discoidal shell beads; large lanceolate or double-pointed blades; both narrow and broad forms of the rectangular gorget; simple and keeled boatstones; bar amulets; birdstones of three types, namely, truncated, bar, and expanded, ridged-base bar; thin and finely pressure-flaked triangular or leaf-shaped cache blades from which new types of side-

CULTURE SEQUENCE IN NEW YORK

PERIOD		CULTURE		COMPONENT	C^{14} CHRONOLOGY
LATE WOODLAND V	NORTHEASTERN PHASE	EAST RIVER ASPECT	MASSAPEAG FOCUS		
		SHANTOK ASPECT	THREE FOCI		
		IROQUOIS ASPECT	PROTOHISTORIC & HISTORIC		
LATE WOODLAND IV	NORTHEASTERN PHASE	IROQUOIS ASPECT	PREHISTORIC		
LATE WOODLAND III (TRANSITIONAL ?)	COASTAL PHASE	WINDSOR ASPECT	SEBONAC FOCUS		
	NORTHEASTERN PHASE	EAST RIVER ASPECT	CLASONS POINT FOCUS	PELHAM KNOLLS CLASONS POINT	
		OWASCO ASPECT	CASTLE CREEK FOCUS	BAINBRIDGE CASTLE CREEK	
LATE WOODLAND II	COASTAL PHASE	WINDSOR ASPECT	SEBONAC FOCUS	OLD FIELD A AQUEBOGUE SEBONAC	
	NORTHEASTERN PHASE	EAST RIVER ASPECT	BOWMANS BROOK FOCUS	WILKINS GRANTVILLE B BOWMANS BROOK	
		OWASCO ASPECT	CANANDAIGUA FOCUS	LAKESIDE PARK DANSVILLE FLATS KLINK SACKETT	
LATE WOODLAND I	NORTHEASTERN PHASE	OWASCO ASPECT	SNELL FOCUS	SNELL WILLOW TREE	
			CARPENTER BROOK FOCUS	WHITE LEVANNA JACK'S REEF *2 WICKHAM 3 CARPENTER BROOK	
MIDDLE WOODLAND III (TRANSITIONAL)		VINE VALLEY ASPECT	POINT PENINSULA 4 FOCUS	TURNBULL HORTERS' HOME JACK'S REEF *1 WICKHAM 2	
MIDDLE WOODLAND II		VINE VALLEY ASPECT	POINT PENINSULA 3 FOCUS	FALL BROOK (BURIAL) DURFEE KIPP ISLAND (IN PART) VINETTE 3 WICKHAM 1	
MIDDLE WOODLAND I	COASTAL PHASE	WINDSOR ASPECT	CLEARVIEW FOCUS	DYCKMAN STREET 2-B CLEARVIEW	
		VINE VALLEY ASPECT	POINT PENINSULA 2 FOCUS	POINT PENINSULA NORTHROP MENARD BRIDGE *1 JACK'S REEF (BURIAL) MUSKALONGE LAKE PICKINS WRAY VINETTE 2 OBERLANDER *2 (IN PART)	
EARLY WOODLAND III	HOPEWELLIAN PHASE		NEW YORK FOCUS	SEA BREEZE GENESEO SQUAWKIE HILL	
EARLY WOODLAND II		VINE VALLEY ASPECT	POINT PENINSULA 1 FOCUS	GUYLERVILLE FALL BROOK *1 OBERLANDER *2 (IN PART) VINETTE 1	990 B.C. ±170
			MIDDLESEX FOCUS	TOLL-GLUTE PALATINE BRIDGE VINE VALLEY	
	COASTAL PHASE	WINDSOR ASPECT	NORTH BEACH FOCUS	PELHAM BOULDER MATINECOCK POINT NORTH BEACH	
EARLY WOODLAND I (TRANSITIONAL ?)	COASTAL PHASE	WINDSOR ASPECT	ORIENT FOCUS	JAMESPORT SOUTHAMPTON ORIENT	
			PIFFARD FOCUS	RENÉ MENARD BRIDGE *2 PIFFARD FRONTENAC ISLAND 3	
ARCHAIC III			FRONTENAC FOCUS	FRONTENAC ISLAND 2	2980 B.C. ±280
ARCHAIC II	LAURENTIAN PHASE		BREWERTON FOCUS	ROBINSON OBERLANDER *1 SMOKY HOLLOW	
			VOSBURG FOCUS	DUNSBACH FERRY VOSBURG	
ARCHAIC I			LAMOKA FOCUS	FRONTENAC ISLAND 1 GENEVA 1 SCOTTSVILLE LAMOKA LAKE 1*	3435 B.C. ±250

* ARABIC NUMERALS INDICATE A COMPONENT AT A SINGLE SITE AND CLOSED SITES ARE DESIGNATED BY THE SYMBOL *
THIS ARRANGEMENT IS FOR CONVENIENCE ONLY AND IS NOT ENTIRELY IN CHRONOLOGICAL ORDER

FIG. 54

notched points were fashioned; stemmed points with weak, sloping shoulders and broad rounded haft or stem; strike-a-lights; prismatic flake knives, usually of Ohio chalcedony; large antler flakers; copper awls, often double-pointed and rectangular in section, etc.

All of these traits do not usually occur on the same site. Most of them were palpably introduced into New York, either singly or in complexes, probably the latter, for they have similar linkages outside the area to the west and southwest. Many of the typical forms are suggestive of Adena-like cultures in Ohio, West Virginia, Kentucky and elsewhere. The date obtained by Libby and Arnold from crematory charcoal from burial 6 excavated by the writer on the Oberlander 2 site at Brewerton, in central New York (Ritchie, 1944, pp. 152-60) however, is far in excess of any dated remains ascribed to the Adena elsewhere. The figure given is 2948 ± 170 years, which represents an average of two measurements, viz., 2817 ± 270 and 3080 ± 200 years (Arnold and Libby, 1950, p. 7). This all-cremation burial site was correlated by means of stone grave goods, and potsherds in adjacent cache pits, with the nearby Vinette habitation station (Ritchie, 1944, pp. 160-66). There the stone inventory remained constant throughout the midden, while the pottery constituent underwent progressive change from almost exclusively Vinette 1 type in the deeper zone (88%) to the near replacement (89%) of this ware by 12 types of Vinette 2 ware in the upper third of the deposit (Ritchie and MacNeish, 1949, pp. 119-20 and Fig. 42). Apparently a time span of some extent is represented by the total midden and it is impossible to relate the particular burial pit (Number 6) which produced the dated charcoal sample to any specific horizon in the village deposit. Unless the temporal factors involved in Ohio and Kentucky Adena (Arnold and Libby, 1950, pp. 7-8, samples 126, 214), and in early Woodland II in the New York area are revised by new data, it would seem logical to suspect that the latter manifestation in the northeast is pre-Adena and pre-Hopewell, and indeed, may represent the regional expression of a widespread, prototypic, Adena-like horizon in early Woodland II times. Other cultures in this general time horizon appear to embrace Red Ochre of Illinois (Cole and Deuel, 1937, pp. 58-69; Cole, 1943, p. 300) and the Glacial Kame of southern Michigan, northwestern Ohio, northeastern Indiana, and southern Ontario (Cunningham, 1948; Ritchie, 1949, pp. 24-45). This would seem to have its major affinities rather with the north than with the south. Greenman (1948, p. 316) has found an early site in western Ontario where Adena-like traits appear, and it is worth noting that some of the later burials pertaining to the Archaic component at Frontenac Island (Frontenac Island 2) not only produce Woodland elements but foreshadow the growing concern with mortuary matters which was a developing feature of early and middle Woodland civilizations (Ritchie, 1945, pp. 21-2, 92).

The large brachycephalic type of the Laurentian and Frontenac persisted into early and middle Woodland times in New York. The somewhat larger cranial module of the latter series may reflect the addition of maize to the diet at this time. A recent study by Neumann and the writer gave the following averages for the cranial module of the two groups: Frontenac focus males 15.2, pooled early and middle Woodland males (exclusive of Hopewellian) 15.7, Frontenac focus females 14.8, pooled early and middle Woodland females 15.1. Moreover a carbonized corncob fragment was found by Charles F. Wray and the writer beneath a burial in the West Rush (Wray) site, whose grave goods unequivocally link it culturally with the Oberlander number 2 site, which produced the dated charcoal. This earliest reported maize in the east would thus appear to have an almost incredible antiquity (Ritchie, 1944, pp. 125-6). It thus appears that no significant population shift took place in the area at the beginning of this period.

Except for Arnold's and Libby's (1950, pp. 7-8) data concerning the relative chronology of Adena and Hopewell in the middle west, no evidence has recently come to light to alter the writer's opinion that the New York Hopewellian represents the actual infusion of a people and culture from Ohio via the Alleghany valley and the south shore of Lake Erie on the early Woodland III time level. Insofar as the writer is aware, the generally assumed priority of Adena is predicated upon typological considerations rather than upon actual stratigraphic evidence. The present apparent chronological inconsistency might be

resolved by the contrary assumption, viz., that the classic Adena had developed, like early or formative and classic Hopewell, from an Adena-like or proto-Adena early Woodland II foundation, and that it actually survived classic Hopewell, not only outside, but in some regions also within the range of the latter. The consistency of the cultural pattern in Pennsylvania and New York is remarkable and the area of habitation is well defined and limited. The few physical remains amenable to examination lack the robusticity of the Laurentian and related Woodland series and differ also in being dolichocephalic. The related pottery is Vinette 1 and Geneseo Cord-Marked (Ritchie and MacNeish, 1949, p. 121) in the main, and the total complex suggests a relationship with the pre-classical Hopewell of Ohio and local amalgamation with resident early Woodland II groups (Ritchie, 1938, pp. 135-40).

In middle Woodland I times an even clearer demonstration of the spread of a new cultural complex is afforded by the testimony unearthed in New York and in southern Ontario. This introduced from Ontario, and ultimately from farther west (MacNeish, personal communication), into upper New England, as well as a part of New York, the grit-tempered, dentate-stamped, rocker-marked, and cord-decorated pottery of conoidal based form, termed by the writer Vinette 2 ware, and subsequently analyzed into a number of types having various local and temporal distributions (Ritchie, 1949, pp. 19-23; Ritchie and MacNeish, 1949, pp. 100-7, 118; Smith, 1950, p. 134). I suspect, but cannot yet prove, owing to the fact that suitable skeletal material is still wanting, that this break in continuity was related to a second infiltration of dolichocephalic (Lenapid?) people into the northeast who were in large part physically ancestral to the recent Algonkian and perhaps Iroquoian tribes of the area. The first dolichocephals were the Lamoka folk of the early Archaic period (Ritchie, 1932, pp. 117-20; 1945, pp. 18-9). I further suspect that they produced a major impetus behind the emergence of later Woodland cultures throughout the Great Lakes and New England areas, and that the development of the classic Hopewellian pottery is due to this influence.

In New York the interaction of this culture with the already partly synthesized Middlesex-Hopewellian traditions, containing local Archaic survivals, produced the Point Peninsula 2 focus of middle Woodland I times, but the tangled skeins can as yet be traced only in part (Ritchie, 1949, p. 45-9, Fig. 12). The subsequent development into the Point Peninsula 3 and 4 foci of middle Woodland II and III, respectively, is fairly well revealed in the combined sequence from the Vinette 3, Wickham 1, Jack's Reef No. 1, Wickham 2, and Hunters' Home components, all in central New York. Stylistic changes in certain types of pottery, as well as in pipes, harpoons, projectile points, and other elements have progressed variously in the two latter sites and in the Turnbull site in the eastern Mohawk valley, to a point of transition into recognized nascent Owasco forms (Ritchie and MacNeish, 1949, p. 120). It should be noted that some late Point Peninsula ceramic trends are contrary to this interpretation. Furthermore, the mortuary interest manifested in earlier Woodland times is now (middle Woodland III) well on the decline. Simple flexed inhumation with few or no grave goods became the rule, persisting through subsequent prehistoric occupations in New York.

The succeeding late Woodland I stage marks the beginning of the Owasco aspect, represented by the Carpenter Brook, Wickham 3, and other components. Unhappily, no age determinations have been made for these, or indeed, for any Owasco sites, although numerous charcoal samples are already at hand.

The progressive modifications of Owasco culture in late Woodland II and III times, seemingly due mainly to the operation of internal causes, have been worked out in some detail, through the excavation of a number of sites (Ritchie, 1944, pp. 29-101; Ritchie, 1946; Ritchie, Lenig and Miller, n.d.). A large number of linked traits (Ritchie, 1944, pp. 41, 46; 1947, p. 69), the physical type concerned (Ritchie, 1944, pp. 100-1), and the recently established ceramic trend (Ritchie and MacNeish, 1949, p. 121), point in many respects in the direction of recognized Iroquoian forms and MacNeish has recently advanced the hypothesis of an *in situ* genesis of Iroquois cultures stemming from four separate Owascoid or Owasco sequences in southern Ontario and in New York state (MacNeish, n.d.). This assumption is at present undergoing intensive scrutiny by means of field and laboratory researches in Canada and New York (Ritchie, n.d.).

In current perspective, then, the northeast no longer appears as an isolated or semi-sequestered peripheral area, with a marked temporal lag as respects other areas of the eastern United States. Both on geological evidence (Johnson, 1949, p. 126) and in terms of radiocarbon dating it has evidently been the home of man for a minimum of some 6000 years. Moreover, not only has it participated, apparently synchronously, in most of the major cultural developments of the eastern United States, but accumulating data reveal more clearly here than elsewhere, certain developmental trends as, for example, in the modifications in ceramic typology (Ritchie and MacNeish, 1949) and of the smoking pipe. This latter has progressed from the tube form in stone or clay, of which two varieties, viz., an earlier or blocked-end (Middlesex focus) and a later or cigar-shaped type (Point Peninsula 1 focus) occur; through the straight pipe type, which differs from the latter in having a well-formed bowl chamber connected with a sharply constricted stem tube (beginning in Point Peninsula 2 focus); to obtuse angle elbow forms, ranging from nearly straight in older Woodland times, to the approximately right angle varieties of the later Owasco and Iroquois aspects.

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FACTS AND COMMENTS

STEPHENSON AND KRIEGER ON "CULTURE CHRONOLOGY IN TEXAS"

Stephenson's recent synthesis of Texas archaeology (1950) has evoked a markedly critical commentary from Krieger (1951). Krieger comments on the many inaccuracies which he finds therein. There are without question, mistakes of both omission and commission in Stephenson's paper. Nevertheless, the synthesis provides the general archaeologist with a relatively accurate, helpful and stimulating view of the aboriginal occupation of the entire State. It is my impression that a synthesis such as that of Stephenson must inevitably be inadequate or actually erroneous in detail. The significant point is that Stephenson has actually published and should be credited with a tentative and worth-while state-wide synthesis of Texas archaeology and, furthermore, has succeeded in evoking comment from both Krieger and the writer. The critical archaeologist who successively reads Stephenson's article, Krieger's criticism, and this commentary will certainly become acquainted not only with the established data of Texas archaeology but with many of the controversial points as well.

The oldest extant synthesis of Texas archaeology was published by Sayles in 1933. This valuable synthesis is now outmoded, but Sayles' general outline is still incorporated in the work of most of the more recent investigators. Kelley and Campbell, in 1940, published a somewhat more limited correlation of Texas archaeological cultures which has been little used and can be ignored without serious loss. In 1946-47, Krieger published an extremely helpful synthesis of the archaeology of northern and eastern Texas, which, though full of merit, none the less contained errors. Also, in 1946, Griffin included a graphic outline of Texas archaeology in his "Schematic Presentation of Cultural Units in the Southern Part of Eastern United States." Griffin attributes his Texas material to Krieger (p. 84). The portions of this synthesis dealing with Texas archaeology are confusing and the terminology, in some instances, does not coincide with any of the current published schemes.

An unbelievable amount of archaeological field work has been completed in Texas during the last two decades, but aside from the work of Krieger, very little of this work has been reported in published form. As a result, the archaeology of Texas is known to other workers largely either through hearsay or from the efforts of Cyrus N. Ray and other amateurs. Consequently, such a synthesis as that produced by Stephenson is badly needed.

But, for this very reason, Krieger is correct in emphasizing that Stephenson's article should be subjected to a thorough and critical analysis so that workers unfamiliar with the region will not be misled. And there are inaccuracies in Stephenson's article. Ignoring for the moment the putative errors listed by Krieger, I would like to point out some items that, in my opinion, need clarification or correction. Stephenson's survey of Trans-Pecos archaeology is, in general, very good, but it should be noted that the Chisos focus of the Big Bend aspect was agricultural and probably possessed the bow and arrow. He speaks of the Maravillas and Santiago foci, when, in fact, these "foci" represent archaeological complexes known from only one site each. The Maravillas complex probably should be dated not later than 2000 B.C., and it is perhaps much older than this. This complex probably represents an earlier manifestation of the Pecos River focus. The Santiago complex, on the other hand, is probably comparable in age to the Pecos River focus and is perhaps ancestral to the later Chisos focus. It should be pointed out that in the extreme northwestern portion of the Trans-Pecos, sedentary agricultural cultures are probably 200 years or more earlier than the 1200 A.D. date noted by Stephenson. Lehmer's Mesilla phase, dated *circa* 900 to 1100 A.D., probably extended into Texas, and his Dona Anna phase, dated 1100 to 1200 A.D. (Lehmer, 1948), most certainly did.

In his survey of central Texas archaeology Stephenson makes, in my opinion, one serious error. The archaeological cultures of the Texas Coastal Plain should not be included in either the central Texas area or the Gulf Coastal area, but belong in a separate archaeological region. Otherwise, his survey of central Texas archaeology is good but does not adequately express the complexity of the cultural picture in either the prehistoric or historic periods. If the central Texas cultural picture were as clear as Stephenson depicts it, my own intensive field work in this region could have been published long ago.

With regard to the Panhandle and eastern Texas, my own research experience is inadequate, and consequently I prefer not to comment on this portion of Stephenson's article.

On the whole, I think that Stephenson's table (Figure 50) is relatively accurate for the Trans-Pecos and central Texas regions except for the date of the Santiago complex in the west and the time of the appearance of the Apache in central Texas, which is perhaps shown a half century too early. As Krieger points out, Stephenson's date of 1550 for European contact in central Texas should probably be 1650.

Some of Krieger's specific criticisms of Stephenson's paper may now be considered. In general, Krieger's criticisms appear to be harsh and to ignore the good points of the synthesis. Krieger, with some justification, criticizes Stephenson's division of Texas into five archaeological regions, but a similar criticism could be made with regard to any division of the state into archaeological regions. Since an article such as Stephenson's demands some type of geographic differentiation, the five-fold division appears to be about as convenient and accurate as any of the others currently in use.

Again, Krieger points out quite accurately that the Archaic cultures of eastern Texas and perhaps those of the Panhandle and the Gulf Coast should not be includ-

ed in my Balcones phase. However, I know of no objective criteria which will satisfactorily differentiate the Balcones phase from the Southeastern Archaic horizon on the one hand and the desert cultures of the southwestern Archaic horizon on the other hand. It is not surprising, therefore, that Stephenson or any other investigator unfamiliar with the details of the problem should have difficulty in properly clarifying the Archaic cultures of Texas.

Krieger comments unfavorably on Stephenson's arbitrary dates for the range of the various Texas cultures, but, in fact, Stephenson in the text properly qualifies his selection of dates, and the dates which he uses on his chart are not necessarily any more misleading, arbitrary or inaccurate than those shown on similar charts by other Texas archaeologists. Krieger quotes me as placing the beginning of the Balcones phase cultures at about 2000 B.C. instead of 3000 B.C. as stated by Stephenson. What I actually said was that these cultures probably began about, or sometime before, either 4000 B.C. or 2000 B.C., according to which scheme of dating world-wide climatic cycles one follows (Kelley, 1947). Stephenson apparently has merely taken the median figure and used it in his chart. As Krieger states, no one can yet advance a completely satisfactory date for the termination of the early hunting cultures, but it seems fairly clear that at least some of these hunting cultures survived into what Antevs (1948, p. 9) calls the Altithermal period, dated *circa* 5000 to 2500 B.C., and that at least some of the Balcones phase cultures originated during that same period. Since Stephenson places the "Arbitrary End of the Early Lithic Hunting Horizon" at *circa* 3000 B.C. and begins the Balcones phase and other Archaic cultures at the same date, his chart seems relatively clear and accurate to me.

Krieger challenges Stephenson's date of 1535 as the time of first historic contact in Trans-Pecos Texas, stating that the date must have been about two years later, if indeed Cabeza de Vaca passed through the Trans-Pecos region at all. Here, Krieger appears to be clearly in error. Although the exact route of de Vaca's journey through the West is unknown, he certainly must have passed through at least part of Trans-Pecos Texas, and in the year 1535 as stated by Stephenson. This is certain, because Cabeza de Vaca rejoined his countrymen in Mexico in March, 1536, having reached western Mexico by January of that year (Hodge, 1907a, pp. 102-4, 111, 119). Krieger is correct, however, in pointing out that Stephenson should have used the year 1528 for de Vaca's first appearance on the Texas Coast. Technically, however, both Stephenson and Krieger are in error as to the beginning of historic contact on the Coast, for the Spanish explorer Piñeda actually mapped, with some accuracy, the entire shoreline of Texas as early as 1519 (Bolton, 1912, p. 3).

With regard to the first appearance of historic ethnic groups in Texas, I am largely in agreement with Krieger's criticism; however, Stephenson appears to place the beginning of Apache occupation of the Panhandle at about the same time that Krieger does in his 1947 chart. Actually, there is some reason for believing that the Apache had appeared in the Texas Panhandle only a decade or so before the coming of the Coronado expedition in 1541. Castaneda, historian of the Coronado expedition, noted in 1541 that, according to the Indians of the Pecos Pueblo, warlike Plains tribes, presumably the Apache, had first appeared in that region about 16 years before at which time they had destroyed several of the neighboring Indian pueblos (Hodge, 1907b, pp. 356-7).

Perhaps the Comanche did not appear in the Panhandle as early as 1700, but, contrary to Krieger, they were the cause of wide-spread dislocation of Apache tribes in west central Texas in the latter half of the eighteenth century, if not earlier. Nelson (1940) records the decisive defeat of the Plains Apache by the Comanche in a 9 day battle sometime between 1720 and 1723. After this time the Apache movement southward against the Spanish settlements was accelerated. Stephenson does have the Wichita tribes appearing in the Panhandle at *circa* 1750 A.D.; this date is much too late. As early as 1650, Martin and Castillo noted that the Cuitaos, Escanjaques and Aijados were Indian tribes occupying the area between the Jumano of the San Angelo region and the Tejas of eastern Texas (Bolton, 1912, pp. 9 and 10). These tribes are identifiable respectively with the Kichai, the Yscanis and the Taovayas, the southern Wichita tribes who were found in this same region a century or more later.

Krieger points out correctly that Stephenson is probably in error in describing the central Texas aspect characterized by small, light arrow points and small amounts of pottery as an agricultural horizon, even with the qualifications given. So far as I know, there is no evidence that either the Jumano or the Tonkawa to whom this aspect is attributed ever practiced agriculture at all. Krieger, in turn, is in error in denying that the villages of this group can be described as semi-permanent villages and also in describing the earlier Edwards Plateau sites as more or less permanent settlements. The historical evidence indicates that the Jumano occupied at least some villages in this region throughout many months of the year and, at times, over periods of years. On the other hand, detailed analysis of the burned rock middens of the Edwards Plateau aspect indicates that they were not occupied permanently or semi-permanently, but were occupied for very short periods of time by many different groups, and hence were in no sense permanent settlements.

I agree with Krieger that Folsom, Clovis and Scottsbluff are projectile point names and not cultures, as stated by Stephenson. But, in view of our knowledge of more recent cultures in North America, can anyone really doubt that eventually we shall discover other distinctions between the artifact complexes associated with these various projectile point types and hence establish that they actually represent discrete cultural manifestations?

It will be seen that I agree with many of Stephenson's descriptions, classifications and other data, but disagree with, challenge or deny still others. Also, I find many of Krieger's criticisms of the original paper well taken but believe many of them likewise to be erroneous or subject to challenge. I have no doubt but that a careful perusal of my own critique would also reveal errors of fact or interpretation. Nevertheless, it seems to me that out of this triad of articles should emerge a somewhat clearer picture of the aboriginal occupation of Texas. If T. N. Campbell, Ted Sayles, Joe Ben Wheat, W. C. Holden, Victor J. Smith, Donald Lehmer, Erik Reed and others who have added to our knowledge of Texas archaeology could be persuaded to contribute articles to this symposium, American archaeologists at large might for the first time have some idea of what actually transpired in prehistoric Texas.

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A NEW-FOUND VOTIVE AX FROM MEXICO*

In December, 1948, Georgetown University, Washington, D.C., discontinued its collection of curios and presented the lot to the United States National Museum. Among other treasures was a votive ax depicting the "tiger" or "jaguar" god of tropical America in the style peculiar to the Olmec, or La Venta, culture. There are no accompanying data; even the name of the donor has been lost. In want of data and in other respects the ax is reminiscent of the half dozen like specimens preserved in public museums.

The ax is carved from a volcanic rock, probably andesite or basalt, and measures 9¼ inches high by 4⅞ inches wide and 4 3/16 inches thick. The photograph reproduced as Figure 55 shows the simplicity of concept and execution that set this example somewhat apart from others of its kind. Except for battering about the nose and mouth—mutilation apparently done with a stone hammer—the ax has suffered surprisingly little damage. At first glance this battered area suggests the carving was never quite completed but, upon closer inspection, it will be noted that the central depression, the two on either side the fangs, and the space between the nose and lip possess older, rubbed and weathered surfaces.

Twenty years ago Marshall H. Saville (Votive axes from ancient Mexico. Indian Notes, Museum of the American Indian, Heye Foundation, Vol. VI, pp. 266-99, 335-42. New York, 1929) illustrated and described the five votive axes known at that time. Two were in the American Museum of Natural History, New York City, and one each in the British Museum, the Peabody Museum of Harvard, and the Museum of the American Indian, Heye Foundation. The present writer is unaware of any subsequent addition to that series other than the one now before us.

This latter is smallest of the six and the least sculptured. A jaguar-god mask fills the upper front; the lower third symbolizes the blade of an ax. At the back of the head there is a transverse bulge across the top, grooved vertically in the middle, as in the Heye Museum specimen; otherwise the back is perfectly plain, except for a little spalling and half a dozen cuts from a machete or other steel tool. Viewed from the front, the mask dominates the whole, as it should, but, instead of

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being separated from the lower part by the customary groove, it protrudes or overhangs on all sides, from one-quarter inch at the rear to one-half inch in front. The blade width is a trifle greater near the lower margin than at the neck; its bit is merely suggestive of a cutting edge. Three-quarters of the bit has been bruised but the remainder is just as the artist left it. This portion is rounder, not beveled, and its degree of bluntness may be gauged from the fact that, half an inch above its edge, the blade is 1½ inches thick and, one inch above, 2 inches thick.

Compared with the other five, our specimen is noteworthy for its simplicity and its singleness of purpose. More so than the others, it conveys the idea of the oneness of the ax and the jaguar god. Whatever this may have meant to the man who created this particular specimen, he could not possibly have attained his objective with fewer lines. There is nothing superfluous here; no ears framing the face; no hint of hands and feet; no embellishment of any sort. The work had no utilitarian value; its function was symbolic and what it symbolized remains unknown.

FIG. 55. A jaguar-god votive ax from Mexico. (Photograph from the Smithsonian Institution.)

The grooved ax, a common implement throughout the pre-Columbian United States, was rare in Middle America. On each of the five votive axes illustrated by Saville, a groove separates body and head; each possesses a bit that is thinner and more sharply edged than that on ours. Our ax, to a degree greater than either of the others, focuses attention immediately upon the face, the jaguar mask. At least three of Saville's axes portray a large mask resting upon the shoulders of a human figure with hands on chest, clasping a knife. The Dorenberg ax in the American Museum of Natural History, although more conventionalized, appears also to belong in this category.

Despite its mutilation, our specimen clearly had the full, upturned lip and the fangs that characterize the other five. Its broad nose is surmounted by an elongated stud or boss, grooved transversely across the middle and the upper half, at least, grooved vertically in line with the forehead cleft. On our specimen the eyes, instead of being oval and slanting, are rectangular, after the manner of the British Museum and Harvard axes, but more deeply recessed. Over each eye is a rectangular element given a raised appearance by the rubbing and pecking away of the stone on all sides. The upper edge of each rectangle is notched in the middle, vaguely suggesting the flamboyant "eyebrows" of the British ax.

Another feature in common with the British specimen is the forehead notch or cleft. In our case the notch was produced by sawing with an abrader; it is a groove that extends across the crown and down through the bulge at the back. The Dorenberg and Heye Museum specimens also have this bulge behind, grooved vertically and half way over the top. The famous jadeite ax in the American Museum of Natural History shows the forward end of such a groove on top but we can not be sure of the bulge since the upper back part of the head has been cut away. The groove or notch, therefore, whatever its length and position, appears to have been a ceremonial requirement for it is present on four of the six examples under consideration and, for the other two, information is lacking. The notch or groove is even more apparent on certain analagous carvings found in the Olmec country and unquestionably connected with the cult of the jaguar-masked ax.

Saville illustrates a stone idol discovered by Blom in 1925 near San Martin Pajapan, Veracruz, and calls attention to the deep forehead cleft in its jaguar mask. Like clefts are to be seen also on two other objects illustrated: a jadeite ornament from Oaxaca and a greenstone idol formerly owned by Hermann Beyer. The published illustration of Beyer's idol prompted readers to send in photographs of two comparable specimens, one in the Museo Nacional of Mexico and the second in the United States National Museum. Saville reproduced both in the second part of his essay and we are thus in a position to point out certain features they share with the votive axes.

In the first place, the three are tabular rather than ax-like although Saville (*ibid.*, p. 336) describes the one in

the Museo Nacional as a "votive ax." In common with the jadeite ax at the American Museum, the British and Heye Museum examples, the three tablets each represent a standing or kneeling human figure wearing a sculptured jaguar mask while incised lines suggest details of anatomy and of dress. The result may properly be described as bas-relief. Compared with the other two, there is more of sculpturing on the National Museum tablet (Figure 56). Physical features were first sketched by incisings and then the stone was cut away from one or both sides of the line to produce a rounded effect. In their purposefulness and the skill with which they were made, many of these cuttings suggest the work of an engraver and all evidence the hand of a master craftsman. The deepest reductions, at the neck and below the knee band, do not exceed ⅛ inch. That the forehead cleft was produced with a stone saw is obvious since the groove, 1¼ inches wide at the top, narrows as it extends down the back to a point opposite the mouth. The solid "V," pendant from the middle upper jaw, may be a purely decorative device separating the fangs but, in either case, it repeats one on the Harvard ax and, perhaps, replaces corresponding pits on the votive ax in the United States National Muesum and on the jadeite ax in the American Museum of Natural History.

The faces on the Beyer and Museo Nacional tablets have slanting eyes while eyes on the National Museum specimen are indicated by incised, waved lines beneath sculptured brows and eyebrows, the latter "feathered" like those on the British Museum ax. On the Museo Nacional tablet, the same type of eyebrow is represented by incising.

Stirling's recent explorations in the Olmec homeland disclosed much of archaeologic interest, including huge stone monuments depicting the jaguar-faced god and several colossal stone heads even more puzzling. A "baby-faced" human figure at La Venta, State of Tabasco (Matthew W. Stirling, Great stone faces of the Mexican jungle. National Geographic Magazine, Vol. 78, pp. 309-34. Washington, 1940), is not only kneeling, after the manner of the stone figure near San Martin Pajapan, but holds a rectangular box at waist level and wears a broad roach over the top of the head. The votive ax in the Peabody Museum, Harvard, has a similar but smaller headdress.

Among the great stone monuments at La Venta are several that display the jaguar mask. One of them, described as an altar (Matthew W. Stirling, La Venta's green stone tigers. National Geographic Magazine, Vol. 84, p. 328. Washington, 1943), shows the conventional jaguar mouth, deep-set rectangular eyes, and, at brow level, an ornamental device that reminds one of the nose stud on both the National Museum ax and the little jadeite ornament in the Museo Nacional of Mexico, figured by Saville (Fig. 100, p. 341).

Thus the jadeite tablet and the votive ax of basalt now in the National Museum at Washington possess certain individual qualities in addition to others shared by the few comparable objects elsewhere. These attributes in common establish an undeniable kinship between the votive axes and the tablets, identifying both with the same mysterious cult. Every specimen noted herein bears the distinguishing features of Olmecan art and, although the place of exhumation remains unknown in each instance, all surely came from the restricted area within which that art flourished and died.

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FIG. 56. A votive tablet of the jaguar god, probably from the state of Oaxaca, Mexico. (Photograph from the Smithsonian Institution.)

THE ENIGMATIC CRYSTAL RIVER SITE

The Crystal River site, on the west coast of Florida about 65 miles north of Tampa, presents one of the many unsolved problems of Florida archaeology. Included in the site is a curving shell ridge, shaped like a fishhook with a temple mound where the barb of the hook would be, a large sand or sand and shell burial mound surrounded by a platform to the north, another temple mound further to the north, and a large deposit of shell to the northwest (Moore, 1903, Fig. 16). Obviously, this is a large and complicated site. Practically the only archaeological work done at Crystal River is that of Moore who, during his three visits, dug all the burial mound and part of its surrounding platform (Moore, 1903; 1907; 1918). Moore did no work in the shell midden or temple mounds and our knowledge of the site is limited to its burial complex.

Greenman (1939) pointed out that a number of Hopewellian traits had been found at Crystal River by Moore. Willey and Phillips (1944) discussed negatively painted pottery from the site and, as much of the other pottery could be classified as Weeden Island, concluded the site and hence the negatively painted pottery were of that time period. The apparent association with Hopewellian traits they left to be settled at a later date.

In 1948 Willey presented a culture sequence for the Manatee region of Florida. In his correlation table he intended to show, for the central Gulf Coast area, a Crystal River I period equivalent to Santa Rosa-Swift Creek and a Crystal River II period equivalent to Fort Walton-Safety Harbor (Willey, 1948a, p. 216). Due to an odd set of circumstances the table was not so published (Willey, 1948b, p. 327, fn. 13). This was unfortunate as it was probably nearer to the true situation than anything which has been printed about the site.

The same year Willey again brought up the question of negatively painted pottery as examination of collections at the R. S. Peabody Foundation at Andover disclosed a negatively painted vessel in Moore's collection from the Green Point mound. As other containers from Green Point were Santa Rosa-Swift Creek in type, he reversed the previous conclusion and decided that all of the burial mound at Crystal River, including the negatively painted vessels, was also Santa Rosa-Swift Creek in date (Willey, 1948b). It is interesting to note that Moore described 12 vessels from Green Point but did not mention any painted pottery (Moore, 1902, pp. 249-56).

Again in 1949 Willey discussed the Crystal River site and wrote, "The Crystal River platform seems to me to date, primarily, from the Santa Rosa-Swift Creek period as does the (burial) mound proper" but footnotes that Goggin places the platform as entirely Weeden Island I (Willey, 1949, p. 322).

In these discussions Willey has rejected the possibility of intrusive burials or of a stratified burial mound. Recent data, not available when Willey wrote, demonstrates some burial mounds of Florida to have grown by an accretional process (Bullen, 1949; n.d.). This represents a passing of time during which cultural changes occurred or might have occurred. At the Prime, Weeden Island, and Thomas burial mounds, bundle burials overlay flexed burials (Bullen, n.d.; Willey, 1949, pp. 107-11 and 116-21) and at the Prime mound Safety Harbor and Englewood pottery types overlay Weeden Island types (Bullen, n.d.).

That a similar process occurred at the burial mound at Crystal River may be inferred from Moore's writings. In his sketch of the burial mound he shows two irregularly sloping, artificial elevations of sand extending from the burial mound onto or into the surrounding platform (Moore, 1903, Fig. 16). These contained burials and from their location may well have been relatively late accretions to the mound. Moore mentions bundle, flexed, and prone burials. That these may have been more or less stratified and so agree with data from the Tampa Bay mounds mentioned earlier, is indicated by the following statement of Moore's:

> Bunched burials, only a few of which were found at our second visit, invariably lay in sand, and were *always* at a *less depth* than the shell deposits beneath which *other forms of burial lay*. However, these bunched burials were found where the mound joined the sloping ground and probably were left over from the *great number of bunched burials which we found in the mound proper* at the time of our first visit (Moore, 1907, p. 408, italics mine).

Another comment of Moore's appears to be significant. Most copper objects seem to have been limited to the base of the mound or to "considerable depths in the mound, from 4 to 8 feet" (Moore, 1903, pp. 399, 408).

Summarizing, it would appear that the copper objects (and by inference the other Hopewellian-like specimens) were relatively deep in the mound proper and so early and that bundle burials were relatively later than other forms of interment. Based on information from the Tampa Bay mounds, I would equate the bundle burials with late Weeden Island or Safety Harbor periods. The flexed burials would be early Weeden Island or Santa Rosa-Swift Creek. Presumedly the prone burials belong to either or both of these last two periods.

The negatively painted pottery vessels could, therefore, have been contemporaneous with early Middle Mississippi (very late Weeden Island) and associated with some of the higher bundle burials; and the Hopewellian material, as indicated for the copper, have come from lower zones which were Santa Rosa-Swift Creek or early Weeden Island in time of deposition.

If this is correct the platform where Moore found virtually no bundle burials would be earlier than the upper portion of, or most recent additions to, the mound proper. Moore's collections are not very helpful in this respect as they include both Santa Rosa-Swift Creek and Weeden Island types. The true temporal relationship may be that the mound proper was built first, the surrounding platform then added, and, finally more additions made to the mound itself.

It has been the intent of this paper to show that the negatively painted vessels from Crystal River are not *necessarily* of the Santa Rosa-Swift Creek time period and that there is good reason to believe they might be

from the Weeden Island period. As Willey originally pointed out, they would fit better, chronologically, in an early Fort Walton-Safety Harbor horizon. In closing I wish to mention than an intrusive burial or an accretion to the burial mound during such a late period is not at all impossible. It is hard to believe the two temple mounds at the Crystal River site to be any earlier than an extremely late Weeden Island period transitional to Fort Walton-Safety Harbor.

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CRYSTAL RIVER, REVISITED, REVISITED, REVISITED

In February of this year, James B. Griffin, Hale G. Smith, Raymond S. Price, A. T. Ewell, MacNeil Withers, and Ralph Barbour made a surface collection of the entire Crystal River complex and dug a five foot test (B) upon the occupational area designated by Moore (1903, Fig. 16) as B.

Test B was made 140 feet from the north corner of the large shell temple mound A, at approximately the same place marked B by Moore (*ibid.*). It was found that the depth of this deposit was forty-eight inches. The test was taken down in the following levels: 1 through 8, and 10 were four inch levels, while 9 and 11 were six inch levels. The sherds collected from mound A and test B were similar in many respects.

The largest percentage of the sherds from test B were Pasco Plain. This type was present from the bottom level to the top. The pottery types appeared as follows: a micaceous paste plain sherd (Swift Creek or Weeden

TABLE 5. CRYSTAL RIVER, TEST B

	Level											
Pasco Plain	1	2	3	4	5	6	7	8	9	10	11	Total
Heavy Temper												
Body	11	5	15	15	16	17	12	9	8	2	1	111
Rim	0	1	1	1	5	3	1	0	1	0	0	13
Moderate Temper												
Body	30	51	7	14	26	41	41	32	55	37	1	335
Rim	1	5	6	5	1	2	5	5	1	4	1	36
Light Temper												
Body	12	20	20	0	7	11	11	6	1	7	4	99
Rim	5	4	0	1	2	4	1	0	1	1	0	19
												613
St. Johns Plain												
Body	1	0	3	3	4	5	1	2	2	0	0	21
Rim	0	0	1	0	0	0	0	0	0	0	0	1
Glades Plain	2	2	2	1	2	0	1	0	0	0	0	10
Micaceous Paste	0	1	1	0	0	0	0	0	0	1	0	3
Limestone and Clay tempered	0	0	0	0	1	3	0	1	4	0	0	9
Unclassified Plain	0	0	4	0	0	2	0	0	3	0	0	9
Dunn's Creek Red	0	3	7	3	2	1	1	0	0	0	0	17
Simple Stamped or scored	0	0	0	0	0	0	0	0	1	0	0	1
												71
												684

Island-like) appeared in levels 2, 3, and 9; St. Johns Plain was found in level 9 and in all levels above, except level 2; a limestone and clay tempered plain type in levels 5, 6, 8, and 9; unclassified plain in levels 3, 6, and 9; "simple stamped" or heavily scored in level 9; Dunn's Creek Red in levels 2 through 7 and Glades Plain in levels 1 through 5, 7, and 9.

The collection from mound A (shell temple mound) was composed of twenty-seven Pasco Plain sherds, and one limestone and clay tempered sherd.

The only comparable series is to be found in Bullen and Bullen (1950), John's Island report. It is to be noted here that Pasco Plain was found in all levels and that otherwise typical Weeden Island pottery contained some limestone. Limestone tempering had a long life span on the central West Coast as is illustrated by the Bullens in their work at John's Island, some 19 miles from the Crystal River site. Bullen (personal communication) notes that limestone-tempered Weeden Island sherds are common in the Florida State Museum collections from Cedar Keys to the John's Island area. Plain sherds are useless as time indicators because of the long persistence in the area of this tempering medium.

Sherds collected from mound H in a 2 by 2 foot test consisted of 8 Pasco Plain. The sherds from tests in sections C and E of the burial mound were similar to those found by Moore (1903, 1907) and fit into the Santa Rosa-Swift Creek and Early (Willey's) Weeden Island periods. However, J. B. Griffin found two St. John's Check Stamped sherds in section C, the first to be recorded from this site. According to Willey's classification, this would place the C portion of the burial mound in Weeden Island II times.

From the above evidence it appears that this site had a long occupation, starting back in Santa Rosa-Swift Creek — Early Weeden Island times when the burial mound was begun. During late Weeden Island times the temple mound was constructed, probably overlapping into the Safety Harbor period. With the finding of check stamped sherds in the burial mound a different light is placed upon the burial mound. It may indicate a much later date for its construction than was hitherto believed.

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A RADIOCARBON DATE ON THE DAVIS SITE IN EAST TEXAS

In a letter dated Jan. 12, 1951, James B. Griffin informed me of a radiocarbon date on the Davis site, received from W. F. Libby of the Institute for Nuclear Studies, University of Chicago. An age of 1553 ± 175 years was obtained on charred corn cobs from a floor pit of feature 31, a large circular house outline in the submound village. According to the published interpretation[1], feature 31 belongs to phase 1 of the Alto focus, had most of the pottery types of this focus on its floor, and probably did not antedate the initial temple-mound construction by many years.

In the conclusions, two alternative interpretations were tentatively advanced: one, that the Alto focus was roughly coeval with the Coles Creek period of Louisiana and its "early" elements must have been marginal survivals; or two, that the site (and focus) were much older than Mississippian cultures are supposed to be, having some horizontal relationship with Hopewell or Copena on the one hand, and with a late Formative horizon in Middle America on the other. Like many others, I believed at that time that Adena should be earlier than Hopewell and Copena, too early for any direct correlation with the Alto focus. To draw attention to the possibility of an early Mississippian or Temple Mound I complex appearing in the eastern United States while Burial Mound II cultures were still strongly in existence, I proposed (under the second alternative) that phase 1 might date "somewhere around 500 A.D., if not earlier." The radiocarbon date, if acceptable, comes out about 400 ± 175 A.D.

Griffin's article on "Some Adena and Hopewell Radiocarbon Dates" (Society for American Archaeology, Memoir 8, 1951) presents important information on the time and manner of collection of the dated material assigned to these cultures, and the evidence for their association. His basic argument, that "The present radiocarbon dates for the Adena and Hopewell periods are directly contradictory to current concepts in archaeology," can, however, be questioned.

By Griffin's own admission, the supposed position of Adena before Hopewell has not been demonstrated by direct stratigraphy. The precedence of Adena is generally assumed from its content; it apparently contains more continuities of Archaic traits than does Hopewell, and hence would logically occupy an ancestral role for the latter. The current radiocarbon datings suggest that this may not have been the case, so it would seem that other explanations for the Adena–Hopewell relationships should be thoroughly explored. It may be suggested that both cultures emerged from an Archaic background in part, and in part from new influences or migrations from

[1] H. Perry Newell and Alex D. Krieger, The George C. Davis Site, Cherokee County, Texas. Society for American Archaeology, Memoir 5, 1945. Volney H. Jones' analysis of the Davis site corn and his reconstruction of corn diffusions in North America are found in the appendix. The dated corn is from lot 5886 (see p. 248).

somewhere outside the United States (most likely from somewhat different sources and probably not contemporaneously), but due to culturological processes one retained more Archaic elements than the other, or retained them longer. Such matters are at least worth consideration, but Griffin merely states that the dates for one or the other must be wrong. While more or less accepting the two Adena datings of 441 ± 250 and 782 ± 150 A.D., he takes the view that all four Hopewellian datings (386 ± 250 B.C., 335 ± 210 B.C., 94 B.C., ± 250, and 1 B.C. ± 200) must be wrong.

The Marksville period date from the Crooks site (792 ± 250 A.D.) and that from the "Marksville influenced" Bynum site (674 ± 150 A.D.) fall within roughly the same time span as the two Adena dates with their margins of error. The first Adena date falls about 450 years after the last Hopewellian date, and within their margins of error they actually overlap (441 — 250 = 191 A.D.; 1 B.C. + 200 = 199 A.D.). If more dates were obtained an actual continuity of Hopewell-Adena and Hopewell-Marksville might result; at any rate they are not "1000 years" apart or impossible to reconcile even with the scanty dating clues now on hand.

Griffin states that "A significant number of Hopewell characteristics also appear in the Late Woodland and Mississippi periods," and farther along, "The cultural span between Hopewellian and developed Mississippi is not great. . . ." Further, "[the Hopewellian dates] would demand an antiquity for the Mississippi culture which almost no one, with the exception of Krieger and Carter, would propose." The Davis site radiocarbon date is certainly a clue, if not an absolutely certain one, to the antiquity of Mississippian culture; it also agrees with Griffin's statements that Mississippi has continuities with Hopewell; *and* it falls between the present radiocarbon datings for Hopewell and Adena. Furthermore, there is very good agreement between the datings for two Marksville sites (Crooks and Bynum) and the appearance of Marksville-like trade sherds in phase 2 positions at the Davis site, in and on the temple-mound platform; such trade sherds were not found in phase 1 positions, and in 1949 I took this as an inkling that the Mississippian Alto focus had its beginnings somewhat earlier than Marksville, or at least the end of Marksville.

It must be of some significance that one Tchefuncte date (717 ± 250 A.D.) falls between the two Adena dates,[2] for these two cultures have always been regarded as more or less coeval. However, it also comes between the Marksville dates and one still is faced with some explanation for the wide difference between Hopewell and Marksville. Personally, I have always felt that Marksville is but a very weak relative of Hopewell, and that aside from an unquestionable closeness in their rocker-stamped vessels, there are few traits which are so specific that these two cultures must be brought into contemporancity. I think that what is most urgently needed to solve these problems is a detailed mapping in space and time of several hundred archaeological traits in the eastern United States, so that the most reliable and restricted marker traits for each period (whatever the number of periods will be eventually) can be put down for all to see and use. Further datings are of course also a prime necessity in order to determine the direction in which the most important traits were diffused; a trait which is workable as a period marker in one area may be too long-lived in another.

The radiocarbon datings present a challenge to all our ideas and methods. In many cases they are confirmatory and satisfactory. Where they are not, the "accepted alignments" should be examined more critically than ever.

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[2] The other date listed as Tchefuncte (1317 ± 150 A.D.) obviously cannot apply to this culture.

CHIBCHA AESTHETICS

When we look at modern works of art we too often talk of the aesthetic taste of the individual artist without taking into consideration his place in a national culture, or an economic group. Towards "primitive" art we take a completely opposite viewpoint. Even when considering such a highly sophisticated art as that of pre-Columbian America, we are prone to give it an archaeological label and call a work of art an "interesting specimen."

Of course, in the latter instance, this attitude has considerable justification in the fact that the individual artist is not known and cannot be studied. We are forced to consider the work of art as that of some tribe of a certain cultural level. But occasionally it is possible for us to identify a deliberate choice of style by a group of artists to whom other styles were equally possible, and even occasionally practiced within the same tribe. One may point out such things as the "cursive brown-on-cream" which survive side by side with Chimu black wares from ancient Peru; or the delicate simplicity of Aztec domestic wares which never sought to imitate the gorgeousness of Cholulan polychrome vessels. In all these examples we have illustrations of the exercise of aesthetic judgment—of choice between very good alternatives, which to the outside observer look equally attractive.

In the field of Colombian archaeology we find this characteristic choice made by the artist of ability to be strongly marked among the Chibcha peoples. From a limited number of objects we know that the Chibcha metal technicians were no whit behind the Quimbaya in hollow casting, sensitive modelling, and surface burnishing. Yet they seem to have deliberately chosen to simplify their design to a point which reminds one of Picasso's grey period. This simplicity is an unexpected phenomenon, for the barbaric splendor of social organization in such courts as those of Tunja and Bogota, with all their complexes of symbolic ornament and costume,

would surely call for a glittering glossy style. Instead we are faced with an emphasis on the most rigorous simplification of form and restriction of the planes of the third dimension. Metal surfaces are left as granulated as possible; a high gloss is deliberately avoided.

The dull surface is fairly easy to interpret. The Chibcha were intensely interested in colour, and a granulated surface makes yellow gold very yellow indeed, while it renders the coppery "tumbaga" very strongly terracotta in colour. Moreover, the metallurgists knew very well that the colour of the metal was a good index of its quality, and when a granular surface was preserved there was little chance of "surface enrichment" being employed to give a false impression. We know from the accounts given by the Spanish conquerors of the Chibcha social system, that these people were extremely sensitive to matters of rank and its proper privileges, which were often expressed in the wearing of significant ornaments of gold. Some of these can be identified from the appearance of their forms on pottery figures, and in descriptions by the Spaniards. The chiefs wore a series of small flat gold pendants. These attractive necklets must be made from a metal which would distinguish between overlord and vassal. This same distinction was probably applied to the golden pins which warriors wore through their lips, one pin for each enemy warrior slain in battle. As for the figures of the water-serpents, the high-flying sun-god Bochica, and the caged victim of the rain-

FIG. 57. Neck of a pottery vase from Chibcha representing a Chibcha chieftain.

FIG. 58. Motion and form in simplest terms. A Chibcha cast gold pectoral.

sacrifices; they were religious objects and no doubt their quality reflected the standing of the household to which they belonged.

In the pottery of the Chibcha the same spirit of aesthetic choice is noticeably present. They could model pots, paint them with fine design and use colour with a perfection of artistry which is hard to equal in the range of ceramics made without the use of a kiln. There is no doubt of their ability in this field, the specimens are there for all to see.

The Chibcha were fond of fermented maize beer (*chicha*), and they served their chiefs from vases with figures modelled on their necks—noble figures of great chiefs that seem like monuments to magic power. To such heights of modeling, by the simplest means the Chibcha potters rose. They could not make their work

mean; they had no sense of humour, but to them the phrase "significant form" so abused by art critics today, had an explicit and practical meaning.

If one were asked to describe Chibcha pottery in one phrase, "egg-shell" would do very well. The specimens have a very unusual appearance of hard brittleness. There is nothing metallic about this because the potters, like the metal workers, avoided burnished surfaces. It is just the surface quality of open-fired ware brought to the limits of its refinement. The technology of these wares has not been sufficiently studied. Something may yet be discovered from comparison of the ancient wares with the pottery made by modern peasants in the neighbourhood of Bogota, who still preserve many of the beautiful Chibcha forms for their vessels. One of the more difficult problems must have been to keep such thin-walled vessels in shape before firing; some of them are eighteen inches in diameter with walls an eighth of an inch in thickness. As for the forms no wheel was used, but perfect line was achieved. One pot is, in plan, an almost true geometric ellipse, a rare achievement at any time or place. There was an emphasis on precision of line and sharp edges.

In fact the Chibcha hold a unique position among the native peoples of the American continent. In the present state of our knowledge it is impossible to give precise dates to their culture. Few excavation data have been recorded. That they had a considerable history before the Spanish Conquest of 1536 is shown by the distribution of their lanquage which extends far into Colombia and Venezuela, along the eastern Andes and northward into Costa Rica. In Panama and Costa Rica the pottery of the Brunca people, who spoke a Chibcha language reveals the Chibcha aesthetic taste to a high degree. The preferences for undecorated form and matte surface is marked.

It is probable that the initial impulse of this civilization reached the Chibcha from the early Andean culture of San Augustin — some of their pottery forms suggest that hypothesis—but it must have been a very long time ago, and the Chibcha soon felt free to develop their own way of life and high aesthetic qualities in comparative isolation.

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February, 1951

ARROWSHAFT-STRAIGHTENING WITH A GROOVED STONE

Not long ago at Tonto National Monument, Arizona, I discussed with Erik Reed and Lloyd Pierson, National Park Service archaeologists, the grooved stone "arrow-straightener" or "arrow-smoother" and its presumed uses. At that time I held serious doubts that this well-known object had ever had any place in the making of arrows. As a fletcher of some 20 years' experience, I had taken particular note of Pima fletchers and the manner in which they worked their shafts, and was impressed by the ease with which they took rather crooked sticks and made them straight and serviceable as arrows. These sticks were always of arrow weed, or specifically *Pluchea sericea*. Salt River Valley had almost no reed cane (carrizo; *Phragmites*), and I never saw it used. I note also the fact that no grooved stone was used in straightening Pima arrows.

Wood may be bent by first applying heat and moisture. So bent, it will retain about 90% of distortion on cooling. The other ten percent is "spring-back" and must be allowed for in bending to a certain arc. Wood may also be bent by dry heat. Radiated heat is applied to the scorching point in this case and softening is probably due in part to some moisture content but mainly to the melting of residual resin in the wood. There is less spring-back in this case, but also much less distortion is possible. In bending a strip of wood that has been boiled, an actual distortion occurs. On the inside of the curve, the fibers of the wood tend to collapse longitudinally and much in the manner of a short string pushed together from the ends. On the outside of the curve, there is some stretching, but much less than of collapse on the inside. The neutral bending point is under shearing stress and is of no importance here. Lateral distortion is quite easily accomplished by the simple application of force. Less damage to cell structure occurs when the wood is boiled first. When it has dried and cooled, the distortion is permanent.

To proceed, I have repeatedly examined with a speculative eye the reed cane shafts which were exhumed by Pierson with a child burial in the Tonto cliff dwellings. The cane is not fat between the joints, which seem to be leveled, in some manner, without cutting in any way which would sacrifice strength. A bundle of 2 dozen carefully selected canes of *Phragmites communis*, which I cut myself near Pinto Creek, does not contain a single piece of comparable uniformity, nor is there one that is even reasonably straight.

I was almost convinced, especially after correspondence and discussion with others interested in archery, that the grooved stone "arrowshaft tools" actually had some entirely different function. Experiments, however, demonstrated rather conclusively that the grooved stone tools in question were indeed extremely successful as arrowshaft-straighteners for reed cane (*Phragmites communis*), but not for arrow weed (*Pluchea sericea*), though not practical as shaft-smoothers.

Tests were made to determine the possible use of the grooved stone, referred to as an arrow-straightener, arrow-polisher, etc., with a specimen of slaty shale from a lower Pinto Creek ruin, with three grooves 2 inches long. The bottoms of the grooves are highly polished. Other materials used for the tests included eight shafts of *Pluchea sericea* (Arrow Weed) and eight of *Phragmites communis* (Reed Cane).

Test 1. Four shafts of arrow weed were straightened by heating over a bed of mesquite coals; of little interest,

since bending by hand was quite easy. I have seen many Indians use this method and have previously used it myself.

Test 2. Four arrow weed shafts intended to be bent with the heated stone were abandoned. The first one absorbed so much heat that the stone had to be heated twice before the shaft was affected much.

Test 3. The four shafts of reed cane were dampened and warmed, and an attempt was made to straighten them by hand. I had tried this before. This cane would collapse before much distortion took place, whether slightly or thoroughly wetted. It invariably snapped off at the joints when sufficient pressure was applied. All four were failures.

Test 4. The stone arrow-straightener was heated just enough to smoke slightly when the cane was applied to it. The cane was first dipped in water to give it elasticity. By a downward pressure and a slight rotating motion, it was possible not only to straighten the cane but also to actually reduce the diameter at any point. It was also found that the joints could be "ironed" flat with the body of the shaft. This gave it an even diameter, which is essential in any good arrow. Between the joints it was not only possible to bend it, but the diameter could actually be reduced so as to make an arrowshaft straight and smooth and ready for the fletching and point. No other treatment would be necessary or even desirable.

In my opinion, it is practically impossible to improve on the grooved stone as a means of straightening and forming *Phragmites communis*. Even an electrically heated metal block would be very little faster and no better.

Examination of *Excavations at Snaketown*: Vol. I (by Gladwin and others), failed to show a single grooved stone. Since there are large beds of *Pluchea* in that vicinity, I assume that the stone was neither used nor needed. There were some beds of *Phragmites* in the vicinity, apparently, but evidently it was little used for arrows.

Since it is an arduous task to polish a shaft with such a stone, the term "polisher" is, in my opinion, completely wrong. It would require hours to polish one shaft by such a method. It would be far easier to rub the shaft with a handful of fiber for a few seconds; abrasion could be accomplished readily by dipping the dry wad of fiber in sand. There are ethnological records, however, of the use of a different variety of grooved stone tool as a shaft-smoother by recent Indians in the Plains and Far West. (Cited in J. H. Toulouse, Jr., "Arrow-shaft tools [with notes on their general distribution]," pp. 80-9 in: Clyde Kluckhohn, Paul Reiter, and others, *Preliminary Report on the 1937 Excavations, Bc 50-1, Chaco Canyon, New Mexico*, University of New Mexico Bulletin 345 [Anthrop. Series, Vol. 3, No. 2], Albuquerque, 1939. See also the description of arrow-shaft-making by Ishii, the last Yana Indian, in Dr. Saxton T. Pope's *Hunting with the Bow and Arrow*.) This type is made of sandstone and usually found in pairs. Ethnological evidence is also cited for the use of the polished hard stone tools of this type as shaft-straighteners by tribes of the Southwest and the Pacific Coast.

That the stone implement in question is really an arrow straightener, within the above limits, seems plain to me now. I have a vast respect for the skill of these ancient workers at my own ancient trade as a fletcher.

The perfection of a tool made by "primitives" well over a thousand years ago is astounding. If, as a fletcher, I had been called upon to straighten cane shafts, I would undoubtedly have failed. This grooved stone would have been the last thing I might have tried. I straightened canes until the stone cooled, and heated it again and repeated the experiment just for the pure pleasure of it. When one groove cooled, I found that the next one was still hot and from there I could move to the third one. This stone not only proved to be a good way to form cane; it is the only way I know of.

I am of the firm opinion that the stone is used only for the straightening of cane shafts. For solid shafts such as arrow weed it would not be necessary nor indicated. Heating and bending with the fingers is quite sufficient for such shafts.

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April, 1951

PUEBLO SOCIAL ORGANIZATION AND SOUTHWESTERN ARCHAEOLOGY

One of the most encouraging signs that progress is actually being made in Southwestern archaeology is the appearance of several papers in which approximately the same answers have been reached by workers approaching the problem from different angles. The specific relationships of the modern Pueblo peoples to the various groups of the prehistoric past constitute one of the oldest queries for this region. It is now indeed satisfying to find that the theory of Pueblo origins with which Fred Eggan concludes his ethnological study, *Social Organization of the Western Pueblos* (1950), largely aligns itself with Erik K. Reed's hypothesis, based on a broad summary of material traits (Reed, 1946, 1948, 1949a, 1949b, 1950), and my own suggestions, which parallel Reed's in the main, based on correlations of prehistoric and modern Pueblo kiva types and uses, related social organizations and pottery (Hawley, 1937, 1950a, 1950b, 1951). Anthropologists are learning to work both ends against the middle!

In the volume cited, which is unquestionably the best comparative study and synthesis to date on Pueblo social organization, Eggan's interest has centered on two main points. First, through detailed study of Hopi, Zuni, Acoma, and Laguna, he illustrates his thesis that kinship terminology reflects the social thought pattern of the group rather than resting on the mere exigencies of language and indiscriminate borrowing, and that these western Pueblos, though varying somewhat in social structure, show a single basic system which contrasts with that of

the eastern group. Second, he points out that the emphasis on matrilineal vertical lineage structure which forms the basis of the Western Pueblo system is designed for conservatism and continuity, does not permit easy adjustment to social change, and probably goes far back into the prehistoric past. It is this line which leads Eggan into consideration of past and present hypotheses of origins of the various pueblo groups. And if some of us are surprised to see reconsidered—and carefully refuted—theories we ourselves had long since pursued and dropped as without substance, we might well consider whether theorists are not as responsible for public withdrawal of such thought-children as for their original presentation.

Eggan differentiates, on social organization, the western Pueblos (Hopi, Zuni, Acoma, Laguna) from the fifteen eastern Pueblos of the Rio Grande area—including Tiwa, Tewa, and Towa branches of the Tanoan linguistic stock, and the eastern Keresans.

The Tewa, in complete contrast to the western Pueblos, utterly disregard the lineage principle. Their major group of relatives consists of descendants of great-grandparents on both sides of the elementary family. "The kinship system provides the best evidence that the clan system has not been important in recent years." The modern Tewa dual divisions, primarily patrilineal and usually mentioned in the literature as moieties (although not exogamous) carry all important functions and organizations concerned with government and religion.

Eggan's statement that the two groups are tied to a dual kiva system appears to be an error for which the incomplete understanding and possibly preconceptions of ethnologists reporting on the Tewa in the past is responsible; detailed analysis of pattern seems to indicate one big-kiva, two moiety-chief houses, and several society houses (Hawley, 1950a). The only existence of "clans" consists of names, said by some to be matrilineal, by some to be patrilineal, and by all to be functionless.

The northern Tiwa of Taos pueblo show a similar dual division, although each division is composed of several non-lineage kiva groups of religious orientation, nonexogamous, and sometimes erroneously referred to as "clans." The organization of Picuris and Sandia is almost unknown. Isleta, our representative for the southern Tiwa, shows the pattern of dual division; but recent checking indicates that Parsons (on whose information Eggan relied) was misinformed as to there having been two kivas; native Isletans insist they have never known more than one; and we suspect past confusion of kivas with moiety houses, which are merely the homes of incumbent moiety chiefs, used for moiety ceremonies. "Clans" exist only as matrilineal but not exogamous divisions of "Corn groups," which function primarily in crisis rites for the individual. Jemez, the one existing Towa pueblo, admits (rightfully) borrowing so much from its Keres neighbors that no yet published analysis of its social structure shows the native pattern.

Considering how very meager is our evidence of any Tanoan understanding of actual clan structure, and adding Eggan's own statement that the Tanoan kinship pattern is aligned on a horizontal rather than the vertical system characteristic of clan-patterned groups, we wonder whether the author should go to such lengths in explaining how the Tanoans may have lost a once-existent clan system. Personally, I find his marshalling of data the best argument yet set forth for this people's never having used the clan system but developing instead, through the prehistoric past, a working structure based on the united bilateral family group, the larger parallel group of bilateral relatives, and the still larger dual division usually referred to as the "moiety," with its tendency toward endogamy.

The slight evidence of "clans" in any of these Tanoan peoples seems to be more easily explained as a superficial and incomplete evidence of borrowing from Keresan neighbors than as a vestigial trait of one-time importance. The possibility that these "clans" actually are religious societies, approximately comparable to those which put on ceremonies in the Hopi clan-owned kivas but which are not themselves clans, should be considered.

Eggan accepts Reed's (1949) suggestion that the Towa and Tewa migrated into the Rio Grande from the San Juan region (the former probably arriving first), the Tiwa representing the original Anasazi inhabitants of the upper Rio Grande area. If this be so, the Taos system of several kiva societies (without clan characteristics) within each "moiety" group would seem an applicable explanation of the old system of several small kivas per village, as seen in the ruins of the Mesa Verde area. Eggan further quotes Reed (1949) in bringing the people of Jemez out of the Chaco area in the twelfth century. Reed later (1950) accepts Stanley A. Stubbs' suggestion, based on pottery and architectural features, deriving Jemez from the prehistoric Largo culture of the Gallina area, a theory which happily coincides with Jemez tradition. To fill in this new vacancy in Chaco occupation, Reed offers it as a home for the prehistoric Tewa proper or northern Tewa and leaves the Tanos or southern Tewa as Mesa Verde people who came eastward to the Galisteo basin about 1300.

This hypothesis does not affect Eggan's historic reconstruction, for he deals with Tanoans as a whole rather than in subdivisions. But I should like to vacate the Chaco again for a moment and place all Tanoans in the general Mesa Verde country—leaving the Chaco for original occupation possibly by Zunis but more probably by Keres whose primary ties were with the more southern groups of close pottery and kiva affiliation in the Zuni-Acoma-Cebolleta-Mt. Taylor area (Haury, Gladwin, Roberts, Hawley), a part of the extensive region which Eggan, Reed, and I all feel to be ancestral to the western Pueblos of historic times. Recent identification of Chaco big kiva cists as "foot drums" of the Zuni-Acoma type (Abel, ms. in preparation) increases the number of previously noted parallels. That such northern extensions of the preponderantly southern peoples should receive considerable influence from their northern Anasazi (presumably Tanoan) neighbors would be expected. The partial reoccupation of Aztec ruins and of some portions

of Chaco sites appears to have been by these northerners, possibly the "southern Tewa" peoples working southeastward (via the Rio Puerco and the Salado) toward the middle Rio Grande later in the twelfth or early in the thirteenth century.

The Hopis themselves, of Shoshonean stock, presumably had an original northern Anasazi background but lost their black-on-white pottery under influence of "Southern Pueblo" migrants coming up from the Little Colorado country during the latter part of Pueblo III and in Pueblo IV.

The movement of Keresans bringing the invention of lead glaze for pottery decoration into the Rio Grande country in the fourteenth century fits Eggan's thesis of retention of western Pueblo basic social structure in the eastern Keresan villages (see also Hawley, 1950a, and 1950b). But I would tentatively suggest other earlier Keresan or at least western Pueblo migrations into the Rio Grande drainage over the periods of late Basketmaker III to Pueblo III, represented by old sites bearing brown wares and mineral-painted black-on-white pottery with concentration on hatched designs.

Eggan uses the Chaco pueblos as an example of an area in which, by Steward's hypothesis, population should be dense and clanship important. Acceptance of this area as part of the old Keresan or Zunian home territory would eliminate Eggan's predicament of explaining loss of clans after the people left the Chaco, for even the Keresans of the Rio Grande have retained marked emphasis on clan functions. But whether Tanoans of the Mesa Verde area once had clans and lost them in adjustment to conditions in the new Rio Grande homes or even after the extensive and troublesome Spanish contacts is a difficult problem.

Eggan proposes some interesting conjectures; his "guess" is that the present dual organization, "the simplest form of segmentary organization, beyond the band or village . . . [which] operates most effectively in relatively small groups" suggests "a fairly long period of development" in "the organization of social, ceremonial, and political activities . . . and the further conceptualization of this division in terms of winter and summer and the associated natural phenomena." The clan situation, if it ever existed in strength instead of being a late superficial loan from the Keres, might, as Eggan maintains, be reduced in importance by the migrations, historic disruptions, and the influence of the Spanish patrilineal system and Catholic marriage regulations. But we note that the same conditions do not appear to have affected Rio Grande Keresan clanship appreciably, an evidence of Eggan's original contention of the strength of a clan or lineage organization; "kinship terms can be borrowed, but the system of organization is largely unconscious."

On the basis of his own strong arguments for conservative retention of a lineage system when once developed, and his admittedly weak arguments for loss of such a system by Tanoans, we can wonder whether Eggan was thoroughly convinced that the people did not leave the Mesa Verde in village groups recognizing a dual organization growing out of and in harmony with their bilateral horizontal kinship system, with small-kiva ceremonial weather control and curing groups (Tewas and southern Tiwas later giving up use of small kivas), and a costume-dance organization within each of the dual divisions (roughly paralleling the two-kiva katchina-costumed dance group of the Keres) but usually using only one large kiva.

Emphasis on lineage remains paramount in Hopi and Zuni. Eggan suggests that the Keresans, likewise organized by clans, came to emphasize weather-curing societies and perhaps lost some of their old emphasis on the Katchina rain cult, still paramount in Hopi and Zuni but not so necessary in the Rio Grande area, where fear of drought was less than in the desert country. For the eastern Keres this cult is in the hands of the two big-kiva katchina-dance societies.

Reconstruction of the migrations of prehistoric Indians may not be of world-shaking significance, and yet the sweat and emotion with which some of us have pursued the problem in the Pueblo area indicates the allure of what anthropologists once considered the one primary end of this discipline. The very difficulty of complete agreement upon its solution, after some seventy years of considerable anthropological concentration on an area in which even the newcomer is struck by the broad parallels between prehistoric and modern Pueblo culture, suggests the difficulties confronting any serious reconstructionist. Archaeology and ethnology at present are effecting a happy marriage: Eggan's summaries of prehistoric movements and of recent social changes add greatly to his interpretations. Linguistics may appear but an affinal relative—but knowledge of the exact relationships between the various dialects of Keresan used in the several pueblos, of the possibility one linguist suggests of some relation between Keres and Zuni, and of the relative distance of the Hopi language from that of their Shoshonean-speaking neighbors to the north would do much to clarify the present problem. Comparative osteology should provide as many data as our potsherds, could we but get the bones and the physical anthropologists together a little more frequently. Multiple approaches to this type of problem through combining the results of studies in the several branches of anthropology appear to offer our only assurance for actually making theses from hypotheses, history from prehistory.

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ROBINSON'S COEFFICIENT OF AGREEMENT—A CRITIQUE

Despite a firm conviction that statistical analyses have a definite place in archaeological interpretations, I want to register a protest against the *Coefficient of Agreement* proposed by W. S. Robinson (*American Antiquity*, Vol. 16, No. 4, pp. 293-301, 1951). Robinson's coefficient is offered as a measure of the degree of similarity between two collections of sherd material. It is arrived at by adding the differences between the percentages of each type of sherd in the two collections and subtracting this sum from 200.

The objection to this treatment lies in the fact that it takes no account of differences in the size of the collections. Every sherd collection must be regarded as a sample representing a universe which is made up of *all* of the sherds in that particular level, site, or whatever. The larger the sample, the more likely it is to give an accurate indication of the true proportions of the various sherd types in the universe from which it was drawn. The smaller the sample, the more likely it is to deviate from those true proportions. Any acceptable measure of the similarity between two such samples must inherently take this into account by allowing for a greater difference between samples from similar universes when those samples are small. Otherwise, the small sample and the large sample are accepted as being equally representative of the universes from which they are drawn. For example, in Brainerd's application of Robinson's coefficient to the Kabah collections (Fig. 92), the samples range in size from 75 to 210 sherds, yet the small samples are automatically given the same weight as the larger ones.

The *mean standard error* is probably the most satisfactory formula for avoiding this difficulty. The standard error for each type in two samples is found by the formula:

$$\text{s.e.} = (\text{po} \times \text{qo})\tfrac{1}{2} \left(\frac{\text{N}}{n_1 \times n_2} \right) \tfrac{1}{2}$$

po = the percentage of the type in the two samples combined.

qo = the percentage of all other types in the two samples combined

N = the total number of sherds in both samples

n_1 = the number of sherds in the first sample

n_2 = the number of sherds in the second sample

The difference between the percentage of the type in one collection and the percentage of that same type in the other collection is divided by the standard error to give the difference in terms of standard errors. The differences in standard errors for each of the types are then added, and the sum is divided by the number of types to obtain the mean standard error, a figure expressing the difference between the two collections.

There is more arithmetic involved in arriving at the mean standard error than in computing Robinson's coefficient, but this disadvantage is more than offset by the fact that the inclusion in the formula of the actual numbers of sherds involved automatically gives a larger standard error for a small sample, thus compensating for the probable sampling error.

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The Stratigraphy and Archaeology of Ventana Cave, Arizona. EMIL W. HAURY. Collaborators: KIRK BRYAN, EDWIN H. COLBERT, NORMAN E. GABEL, CLARA LEE TANNER, and T. E. BUEHRER. The University of Arizona Press, Tucson; The University of New Mexico Press, Albuquerque, 1950. 599 text pages, 66 plates, 118 text figures and 69 tables. $15.00.

This is the long-awaited report on the excavation of Ventana cave by the Department of Anthropology of the University of Arizona. This work was directed by Wilfred Bailey in 1941 and Julian Hayden in 1942, and was supervised throughout by Emil Haury. Ventana cave yielded over 13,300 classifiable artifacts, 39 human burials, and extremely valuable data regarding several cultural assemblages and their relative chronology, faunal and floral associations, and the associated climatic conditions. The cave was first occupied some 10,000 years ago by ancient hunters possessing a somewhat Folsom-like culture; was thereafter reoccupied over a long interval by somewhat later hunting and gathering cultures and finally, without apparent interruption of the sequence, by the agricultural Hohokam and their putative Papago descendants. Dr. Haury and a group of distinguished colleagues representing several fields have labored long and successfully to bring order and significance to the mass of varied data collected.

Ventana cave is a large shallow rock-shelter eroded from the volcanic Castle Mountains of the hot and arid Papago country of southwestern Arizona. The shelter is divided into an upper and a lower chamber by an intervening rock partition. The fill of the lower cave, principally midden, was some 2 meters in depth, and represented the same stages of occupation found in the midden deposits of the upper cave. The fill of the upper cave reached a maximum depth of 4.5 meters and was stratigraphically complex. A permanent spring in this section of the cave was probably the attraction that drew men to the site over the centuries. The stratigraphy of the upper cave was complicated by the flow from the spring, and by deposits left by water entering the cave from the nearby hillside.

Standard vertical and horizontal controls were employed in the excavation of both upper and lower caves. Most of the midden deposits were excavated by a stripping technique, using 2 meter squares and 0.5 meter arbitrary levels. In the lower levels of the upper cave the natural strata were carefully identified and specimens recorded with reference to these levels.

Many of the stone specimens were studied and classified in the field as they were removed. Most of the specimens were studied by Haury and his associates in the laboratory. In the report, artifacts, largely stone, from the older deposits are described first; then the many and varied specimens from the upper strata, divided primarily into "imperishable," and "perishable" artifacts; secondarily by material; and finally into such categories as projectile points, flakers, scrapers, pottery, etc. In the upper layers pottery was used as the principal cultural determinant; in the lower strata, projectile points were used in place of pottery.

The methodical descriptive treatment of the artifacts represents a sensible and practicable approach to the study of such a great mass of specimens. Haury's descriptive analysis of the projectile points is illustrative of the method followed. Projectile points and blades were considered together. Individual specimens were grouped and described in terms of a classificatory system based on shape of stem and blade alone. Thus, all points with expanding stem, sharp lateral tangs, and convex base were grouped together as a subtype (pp. 288-90). Frequency of artifacts distribution by level is presented in Table 21 in terms of such arbitrary units.

Such an arbitrary classificatory system ignores the fine points of projectile point variation in form, size, proportions, and workmanship, and thereby fails to distinguish culturally significant types. In the instance given, a casual glance at the illustrated specimens of this "subtype" (Figure 63, p. 289) reveals the extent to which they fail to resemble each other. But commendably, Haury did not follow the customary procedure and abandon his analysis at this point. Instead he recognized that three specimens classified in this "subtype" belong to a common projectile point type of the Santa Cruz phase of the Hohokam, nine belong to the San Pedro stage of the Cochise culture, and the remaining three points are variations of a new type found in one of the oldest strata in the cave! Depth relations of the specimens in question confirm the type identifications.

Thus Haury derived projectile point types that have cultural and historical significance. Using these types he was able to recognize and place chronologically cultures previously identified in the region. The presentation would have been much more concise and considerably clearer to the reader if these culturally significant types had been recognized in the laboratory, and text descriptions and tabular treatment had been based upon them rather than upon the arbitrary classificatory "types" and "subtypes." But in this instance it is perhaps well that Haury has demonstrated so clearly the limitations of the classificatory method of projectile point typing so widely followed in New World archaeology. It is unfortunate however, that nowhere in this report are the culturally significant types derived from the breakdown of the classificatory "types" described as discrete groups.

Although most of the material culture was analyzed and described by Haury, there is also an informative section on the Hohokam textiles recovered in the upper levels of the cave, written by Mrs. Clara Lee Tanner. Many of these textiles were found with burials. The burials are described in the report by Haury, and the skeletal remains themselves were studied and described by Norman E. Gabel. The two usable crania from prepottery levels were undeformed and hyperdolichocranial,

possessed high vaults, and in general resemble the archaic longheads of western and southern Texas. From the pottery levels came three deformed male skulls and one female, together with six undeformed female and one undeformed male skulls. Gabel believes that these represent two morphological types; first, deformed brachycephals of Anasazi type; second, undeformed mesocranial, low-vaulted skulls suggesting affiliation with the Basketmaker type and with the modern Papago.

Interpretation of the stratigraphy and prehistory of the cave required assistance from the Pleistocene geologist and paleontologist. There is an excellent discussion of the geologic interpretation of the deposits by the late Kirk Bryan, and the fossil vertebrates are described by Edwin H. Colbert. Haury himself described the site and has written its stratigraphy and a chapter on the modern fauna and flora of the cave remains. T. F. Buehrer has written a section (Appendix) on his chemical study of material from the various Ventana cave horizons.

There emerges from the report a carefully drawn picture of the long occupation of Ventana cave. The cave was formed during the Pleistocene. The cemented beds lying directly on the floor of the upper cave were formed during a relatively moist period. They contained fossils of such extinct fauna as the dire wolf, jaguar, ground sloth, tapir, horse, and four-pronged antelope and also some modern forms. The lower conglomerate layer yielded no definite cultural remains but 90 stone artifacts, including two projectile points, were found in the superimposed volcanic debris layer. Haury demonstrates that these specimens, termed the Ventana complex, show close relation with the Folsom complex. Unfortunately, however, only one of two projectile points has the shape of Folsom Fluted points and it lacks the Folsom channel, an omission attributed to the poor quality of the material. Bryan dated this stratum between 25,000 and 10,000 years ago, and suggested that the latter figure is perhaps more reliable. This corresponds quite closely with the recently published carbon 14 date of 9883 years ago for an unidentified Folsom component.[1]

A pronounced erosional disconformity separated the cemented beds from the overlying strata. According to Bryan this unconformity represents a relatively long dry period which may be correlated with the erosional period intervening between the number I and number II beds of the Southwestern Alluvial Chronology. The beds overlying the disconformity were for the most part uncemented and contained the remains of modern fauna only. Bryan believed that the upper beds should be correlated with the number II and III alluvial fills and that they were deposited under an essentially modern climatic regime, although slightly more humid conditions may have prevailed early in their deposition.

Lowest of the upper beds was the stratum of partially cemented red sand lying directly upon the disconformity. The red sand may have been deposited during the erosional epicycle or perhaps at its very end. Haury points out that it may be dated as early as 7000 to 8000 B.C. or as recent as 2500 to 2000 B.C., according to which of the available alternative interpretations and geochronologies one accepts. Fifty-four stone specimens and one bone artifact were recovered from this stratum. Haury calls the cultural manifestation the Ventana-Amargosa I complex, suspecting Californian connections. It should be noted that several of the projectile points illustrated are almost identical with specimens from the Maravillas and Red Bluff complexes of the Texas Big Bend region, which occur in a similar stratigraphic position.[2]

The upper 3-4 meters of fill was almost entirely of cultural origin. Approximately the upper one third of this midden was dry and contained both imperishable and perishable artifacts. The lower two thirds of the midden was "wet" and only stone and bone implements were recovered from it. Continuous occupation with "more or less gradual transition of artifact types and complexes from one to another" appears to be represented.

Artifacts from the lower half of the midden are identified by Haury as representative of both the Chiricahua stage of the Cochise culture and the Amargosa II (Pinto-Gypsum cultures) stage of the western desert. This would seem to equate these stages. The upper half of the dry midden contained artifacts identifiable with the San Pedro stage of the Cochise culture.

The investigators write with less assurance of the dating of these cultures. Haury points out that the Chiricahua-Amargosa I level may date as early as 7000 to 3000 B.C. (Fig. 117) or as recent as 2000 to 1000 B.C. (Fig. 116); while the San Pedro level may date at *circa* B.C. 3000 to 1 A.D., or alternatively 1000 B.C. to 1 A.D. The terminal date is regarded as relatively accurate because of the appearance of the Hohokam culture at the top of the wet midden. Recently published carbon 14 dates[3] for the San Pedro stage (*circa* 2463 B.C.) and the Chiricahua stage (*circa* 4006 to 4508 B.C.) appear to confirm the cultural sequence and to favor the earlier and longer dates for these cultures.

Haury restricts his correlation and discussion of the cultures of the wet midden primarily to the Southwestern area, although freely admitting the danger involved in so doing. I wish to point out that not only the Gypsum cave *pattern* of point occurs in the Pecos River focus of the Big Bend of Texas, as Haury notes, but that the Pinto and San Pedro point *patterns* also occur there (in the Santiago complex and the Chisos focus)[4] and

[1] Richard Foster Flint, "Pinpointing the Past with the Cosmic Clock," *Natural History*, May 1951, pp. 200-6. See page 206.

[2] J. Charles Kelley, T. N. Campbell, and Donald J. Lehmer, "The Association of Archaeological Materials with Geological Deposits in the Big Bend Region of Texas," *Sul Ross State Teachers College Bulletin*, Vol. XXI, No. 3, Alpine, 1940. See pp. 64-71; 107-116.

[3] J. R. Arnold and W. F. Libby, "Radiocarbon Dates," *Science*, Vol. 113, No. 2927, pp. 111-120, 1951. See p. 115, Nos. 515, 556, 519. It is interesting to note that the dates for the Sulphur Springs Stage of the Cochise given here (*circa* 6210-7756) place it between Folsom and the later Chiricahua Stage of the Cochise—exactly where Haury suggests in this book that it belongs.

[4] Kelley, Campbell, and Lehmer, 1940. See pp. 27-9; 110-11.

also in the San Jose complex from near Grants, New Mexico.[5] Furthermore the Gypsum cave *pattern* of point occurs in the Archaic cultures of eastern Texas and apparently continues into later sedentary cultures, and the Pinto *pattern* occurs also in the relatively late Uvalde focus of west-central Texas. In the Big Bend the Gypsum cave point *pattern* is early but toward the end of its time span it exists side by side with the Pinto and San Pedro point *patterns*. Even in the Southwest proper there is some indication that the Gypsum cave form may be older and the Pinto type later. Thus, if the published carbon 14 dates for Gypsum cave (*circa* 8527 to 10,455 B.C.)[6] are applicable to the point type named from that site, the type dates considerably older than similarly dated Chiricahua stage types. But the Pinto *pattern* points from Grants, New Mexico apparently occur in approximately the same stratigraphic position as in Ventana cave.

Although Ventana cave contributes considerable data to an understanding of these wide spread stylistic *patterns* of projectile point construction and their relative chronology, the problems involved are probably too complex to be solved in this site alone.

The dry midden in Ventana cave, and in places the uppermost part of the wet midden, contained both perishable and imperishable artifacts attributable to the Hohokam culture. This rich assemblage of artifacts contributes significant new data to our knowledge of the Hohokam. Lack of space prohibits detailed reference to these finds. Haury notes that now "we know that the Hohokam used sewed and natural fiber sandals, made one-rod and bundle-and-rod core basketry, and had cotton textiles, incorporating such techniques as weft-wrap openwork and gauze weaves" (p. 548). The Hohokam culture appears to have evolved *in situ*, at least here, out of the underlying San Pedro culture with the addition of some exotic traits to the basic culture. The Hohokam occupation is estimated to cover the period between *circa* 1 A.D. and 1400 A.D. Overlying it is a thin layer of late Papago cultural debris, representing the last occupation of the cave.

Ventana cave is unquestionably one of the most important of New World archaeological sites. The Ventana cave report is on the whole excellent in conception and presentation, reflecting equal excellence in the field and laboratory studies. But it must be said that it is a book for the professional archaeologist. There is much here of value for other fields of anthropology—and related disciplines—but such students of human behavior will obtain the information they desire only through careful and arduous study of the basic data. There are only 27 pages of "Final Discussion" appended to the 520 pages of detailed text description and atomistic analysis. Perhaps Walter W. Taylor should have been recruited and induced to interpret the Ventana cave data through use of his "conjunctive method"[7] in a second volume of the report.

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Cochise and Mogollon Sites, Pine Lawn Valley, Western New Mexico. Paul S. Martin, John B. Rinaldo, and Ernst Antevs (No. 1, 1949, 232 pp.). *Turkey Foot Ridge Site, A Mogollon Village, Pine Lawn Valley, Western New Mexico.* Paul S. Martin and John B. Rinaldo (No. 2, 1950, pp. 235-396). *Sites of the Reserve Phase, Pine Lawn Valley, Western New Mexico.* Paul S. Martin and John B. Rinaldo (No. 3, 1950, 177 pp.). *Fieldiana: Anthropology*, Volume 38, Numbers 1, 2, & 3, Chicago Natural History Museum, Chicago, 1949-1950. 577 pp., 222 illusts., 15 tables.

These three papers cover the results of the work of the Chicago Natural History Museum's field party in the upper Gila area, southwestern New Mexico, during the 1947, 1948, and 1949 field seasons. The data presented were derived from intensive reconnaissance of the area and from excavations at a series of sites chosen to represent the different stages in the prehistory of the district.

The earliest horizon recognized appears to be related to the Cochise complex. Artifacts and several hearths were found eroding out of arroyo banks in the valley, and excavations uncovered a single "dwelling area." The artifact complex included small oval to rectanguloid manos, slab and shallow basin metates, one deep open-end basin metate, plano-convex choppers, scrapers, knives, blades, projectile points and gravers. Percussion flaked tools outnumbered the grinding tools 4 to 1. Pottery was not found associated with the complex. The "dwelling area" consisted of a roughly circular floor some 2.5 meters in diameter, without postholes, firepit, or other features. The artifact material is generally similar to that of the Chiricahua stage of the Cochise, but there are enough differences that the writers feel that their material is a variant with a number of similarities to the Pinto Basin complex.

Antevs dates the Cochise material at sometime in the vicinity of 1500 B.C. on the basis of his analysis and comparisons of the sequence of formations in the valley fill.

The Pine Lawn phase is the next stage in the valley sequence. It was previously defined at the SU site, and is represented at the Promontory site reported in this series. The Pine Lawn phase appears to be the earliest horizon in the mountain region of southwestern New Mexico which can be recognized as developed Mogollon. The sites are characterized by large, more or less circular pit houses which show considerable variation in structural details. Pottery includes Alma Rough and

[5] Kirk Bryan and Joseph H. Toulouse, Jr., "The San Jose Non-Ceramic Culture and Its Relation to a Pueblo an Culture in New Mexico," *American Antiquity*, Vol. 8, No. 3, 1943, pp. 269-80.

[6] Arnold and Libby, 1951, pp. 15-16, Nos. 221, 222.

[7] Walter W. Taylor, "A Study of Archaeology," *American Anthropologist, Memoir*, Number 69, 1948.

Alma Plain, San Francisco Red, but no painted types. There is a considerable variety of stone, bone, and shell artifacts. The writers feel that the Pine Lawn artifact complex is essentially the same one which continues on through later horizons in the area. "*The differences between the artifacts of the Pine Lawn phase and those of the later phases lie in small but significant details and in the frequencies of certain types, in the addition of a few secondary artifact categories (such as through-trough type metates), and in the dropping out of a few old categories (for example, basin-type metates)*" (p. 304).

On the basis of the sequence which Haury established at the Mogollon village and the Harris site, one would expect that the next horizon in the valley would be equivalent to the Georgetown phase, and that this would be succeeded by a San Francisco phase. However, only one house from the Pine Lawn valley is tentatively assigned to the Georgetown phase, and only three are placed entirely within the San Francisco phase.

The Three Circle phase is the next complex to be well represented in the valley. The sites are still pit house villages, but by this time the houses have decreased considerably in size, and the shape has changed from round to rectangular. Painted pottery appeared during the San Francisco phase; it becomes a more common part of the complex during Three Circle times. This is also the time of the first appearance of the Anasazi-like red-on-white and black-on-white types. Another innovation is the groved stone ax, which replaces the chopper of earlier times. The white-slipped painted pottery and the grooved ax seem to be forerunners of the heavy infusion of Anasazi traits characteristic of the succeeding phase.

The Reserve phase is the final one established for the Pine Lawn valley. Pit houses are replaced by masonry pueblos, but the structures are extremely crude, and appear to be the first experimentation with a new construction technique. The utility pottery of the earlier horizons carries over, but red-painted decoration is entirely replaced by black-on-white, and the San Francisco Red is largely replaced by Reserve Smudged. In general, this period seems to be one of "Anasaziation" of the older Mogollon tradition.

As yet, tree ring dates have not been released, although a large amount of material has been deposited with the Tree Ring Laboratory. The chronology is necessarily based in part on Antevs' work with the Cochise materials, in part on intrusive pottery, and on typological similarities to adjoining areas.

The writers of this series of papers deserve every credit for the promptness with which their material has been made available, and for the manner in which it is presented. The handling of the factual data is a model of conciseness and usefulness. Descriptive text is held at a minimum, supplemented with profuse illustrations and tabulations.

The series also contains two features which deserve special mention. Each number contains a bar graph showing the proportions of the various pottery types in each Mogollon house for which sherd counts are available. The arrangement of the houses in terms of pottery trends has been used as a tool for establishing a chronological seriation of the individual houses from the entire series of sites. The concept of the chart is an ingenious one which may well be used to good advantage in analogous situations. There are, however, two points which might be borne in mind when evaluating the technique. One is the purely technical one that it might be advisable to replace the simple proportion with some statistical device, such as the standard error, which takes into account the considerable range in the size of the individual sherd samples—a range which is bound to affect the sample's relative reliability as a representative of the actual pottery type proportions. The other is theoretical, to the effect that it might be well to consider the possibility that the differences between villages may be cultural rather than entirely chronological.

The second distinctive feature of the series is contained in the final pages of Number 3. It is an essay in the reconstruction of the changes in the subsistence patterns and in the social organization which are indicated by the changes in the material culture. Written with the help of Donald Collier and George Quimby, and deriving postulates from Murdock's "Social Structure," these few pages are a fascinating pyramiding of hypotheses. Other workers will almost certainly take exceptions to some of the assumptions and conclusions, but the attempt itself is certainly one of which the writers may be proud.

There is one aspect of the data which might merit more attention than it received. This is the absence, or near absence, of certain stages in the cultural sequence, stages which are present in nearby areas. So far, nothing has been found that equates with the San Pedro stage of the Cochise, although one might expect such a horizon between the Chiricahua-like material and the Pine Lawn phase. Even more striking, is the absence of any quantity of material which can be assigned to the Georgetown and San Francisco phases.

These gaps may be due to lack of excavation, but the reconnaissance of the area seems to have produced very little evidence that these horizons are represented in the valley. It seems possible that their absence may be due to an actual depopulation of the district during the time when these stages were in existence in other parts of the area. In the first part of the report, it is pointed out that contemporary climatic conditions in the Pine Lawn valley make it definitely marginal for dry-farming. In view of this, it seems possible that the gaps in the cultural sequence represent periods during which a relatively slight climatic change was enough to rule out a horticultural economy, which interrupted the occupation of the district.

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The Pendleton Ruin, Hidalgo County, New Mexico. A. V. KIDDER, H. S. and C. B. COSGROVE. Carnegie Institution, Contributions to American Anthropology and History, Vol. X, No. 50. Washington, 1949. 46 pp., 27 figs., 1 table.

This contribution is a report on excavations during a five weeks' season in the autumn of 1933 at the Pendleton site near Cloverdale, Hidalgo County, in extreme southwestern New Mexico, a project sponsored by the Carnegie Institution of Washington and the Peabody Museum of Harvard University. The chosen site appeared to be a meeting point of several Southwestern groups, and it promised to be a northern extension of the Casas Grandes culture which centered across the Mexican border directly to the south in Chihuahua.

The original intention of the investigators had been to make the results of the investigations available promptly, and the introduction had been prepared even before field operations began. The untimely death of Mr. Cosgrove and other deterrent events forced abandonment of this objective. In 1947 Dr. Kidder and Mrs. Cosgrove resumed work on the site data, and the present report is the outcome of their researches.

The body of the report is divided into four sections dealing with description of geographical material, the Pendleton Ruin itself, the pottery unearthed, and artifacts other than pottery. The following discussion contains a summary of the results of the project and draws inferences from them. There is also an appendix on survey data.

Seventy-nine rooms of the communal pueblo-like structure were excavated or partly investigated. The rooms were in single, double, triple, or even quadruple tiers on each of the four sides of a rectangular plaza, and in incompleted parts of the site other tiers of rooms appeared to surround another centrally located plaza. A few earlier underlying rooms were also cleared.

Walls were of horizontally coursed puddled adobe. Many fireplaces were in evidence in floors. Scarcity of doorways suggested trap doors in roofs as means of entrance. A minimum of postholes in floors indicated a one-story building. A few floors underlying later ones showed no great age differences. The only large body of refuse was close to the north side of the structure; and, though potsherds were profuse in it, there was little evidence of stratification. Of the six burials found, none had grave equipment with them, nor were any burials found below floor levels as in Chihuahua.

Pottery was the most significant single category of material recovered, and many types were represented throughout the excavations. Cloverdale Plain and Corrugated formed more than ninety percent of all the pottery found, and Chihuahua polychromes were next at five percent. Most of this latter ware was of the type called Casas Grandes Polychrome by Brand, and Ramos Polychrome by Sayles. Other Chihuahua sherds suggested types such as Babicora, Villa Ahumada, and Dublan Polychromes, while only four sherds of Polished Black and none at all of Polished Red ware were found. In addition to the local and Chihuahuan material, there were Gila Polychrome, El Paso Polychrome, St. Johns Polychrome, and other types from a distance, including one Classic Mimbres sherd.

Stone artifacts included a minimum of chipped implements; many metates, different from Chihuahua types; a profusion of manos; and a small number of miscellaneous objects.

From the results of the excavations, certain differences as well as similarities to the Chihuahua culture were noted; and on this basis a cultural distinction of Pendleton from the Ramos (or Casas Grandes) phase of Chihuahua was recognized. It and other apparently similar unexcavated sites of the vicinity are called the Animas phase, a term referring to geographical features of the region, used earlier by the Gladwins. One of the very definite conclusions drawn from the quantities of Chihuahua wares found was that major contacts of the Animas people were with their neighbors to the south.

On the basis of cross-finds of St. Johns Polychrome, Chupadero, El Paso, and other wares in late rooms of the Classic Mimbres Swarts ruin in southwestern New Mexico, and of the occurrence of these same types at Pendleton together with Ramos and other Chihuahua ware and with Gila and Tonto Polychromes of the Salado culture, since Pendleton appeared to have had but a brief occupation, the tentative conclusion is advanced that all of the pottery types found there were approximately contemporaneous.

This would mean either that Mimbres lasted longer than supposed or that wares common to Mimbres and Pendleton were very long-lived. It would also mean that Babicora, Dublan, and other Chihuahua polychromes were contemporary with Ramos instead of predecessors to it as advanced by Gladwin and Sayles. Thus, this would seem to disprove the inferences of the former that Babicora Polychrome design was motivated by migrating Mimbres populations who merged with the people of Chihuahua. Hence the authors find themselves at variance with writers who maintain that Mimbres, and later Salado, met in Chihuahua, and merged there with the local less advanced culture to form the Chihuahua civilization. They prefer to think in terms of parallel developments rather than in those of interdependence. The explanation of abandonment of Animas villages as a result of probable hostile activities of nomadic peoples, likely Apaches, fits well into the general picture both for Chihuahua and for the more northerly groups of the Southwest.

One of the many significant points is the location of this important site, obviously at a trading crossroads in many directions, particularly to the south. Since excavations in any foreign country are usually attended with difficulties, investigations on our southern border should offer encouraging grounds for attempted solutions of the many problems of the meagerly known Chihuahua culture. The geographic position of this culture as the southernmost of all Southwestern groups has often prompted suggestions that it should be the logical place

to look for possible cultural linkages with the higher native civilizations to the southward. Hence the urgency and importance of clearing up sources and connections there. For if traits reflecting Middle American cultures were discovered in this intervening area they would go far toward throwing light on many puzzling problems of the more northerly cultures of the Southwest.

To the types of pottery mentioned in the report as common to Chihuahua but missing at Pendleton might be added Black Incised, Meander Incised Red, and Polished Buff wares. The suggestion that all types of Chihuahua polychromes may have been about contemporaneous invites examination. On purely typological grounds this might seem rather improbable in view of the wide range in decorative treatments, shapes, and techniques observed in the various wares.

We are in accord with the authors that sources and influences back of the Chihuahua culture are not to be found in wholesale borrowings from Mimbres and Salado. The problem is not so simple or easily settled as that. We further agree with them that increased research, particularly within the area itself, will reveal as yet unrecognized earlier stages there. Our feeling is that the present report well shows what can be done with an archaeological site. With a minimum yield of factual data, the authors have made utmost use of the available evidence to advance considerably our understanding of the Chihuahua culture in particular and of the Southwest in general.

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A Report on the Excavation of a Small Ruin near Point of Pines, East Central Arizona. FRED WENDORF. University of Arizona Bulletin, Vol. XXI, No. 3; Social Science Bulletin No. 19. Tucson, 1950. 150 pp., 69 figs., 24 pls. $2.00.

This monograph constitutes the first report in what is expected to be an extensive series devoted to the University of Arizona's long-range program of summer field school excavations in the Point of Pines area of east-central Arizona. Like the preceding bulletins of the University the present publication by Fred Wendorf is a model report, concise and clear, with compact outline descriptions supplemented with numerous maps, text figures, and photographs.

The excavation of a small twenty-one room pueblo and fourteen pit houses, twelve of which underlay the pueblo, presents results of the first two seasons' excavations in the Point of Pines area. As Dr. Emil W. Haury states in the foreword, this first excavation project centered on a site marking the latest Pueblo occupation of the region, possibly extending into the fifteenth century. However, the underlying pit house village was considerably earlier, dating toward the end of the twelfth century.

After a brief introduction and a section on the location, environment, and excavation methods, the report discusses the pueblo and pit houses separately, considering in detail the architecture, pottery, stone artifacts, minerals, bone and horn implements, miscellaneous clay objects, shellwork, and dating of the sites.

The excavation of the compact twenty-one room pueblo, together with two outlying ramadas, furnished the basis for the delineation of a Point of Pines phase, estimated to date between 1350 to 1450 A.D., the latest phase in this area. This phase is characterized by masonry pueblos with irregularly coursed rubble walls, corner storage bins, single to multiple mealing bins, and outside ramadas. Excavations in other sites, not reported on here, have shown the presence of kivas in this phase. Pottery was abundant, including 116 whole or restorable vessels, and comprised elaborate corrugated types, plain red and brown wares, several polychrome types, particularly a local variety of Four Mile Polychrome, but no black-on-white.

Other features include both slab and trough metates, three-quarter grooved axes, arrow-shaft polishers, palettes, stone bowls, triangular projectile points usually lacking notches, flake hoes, bone implements, and a scarcity of shellwork. Only one of the fourteen burials encountered could be definitely assigned to this phase, the others probably coming slightly earlier. Burials were extended on the back, with head usually to the east, and without offerings. From the large amount of cultural material found on the room floors, it was inferred that the pueblo was abandoned rather suddenly, possibly as a result of incoming Apache groups.

The excavation of the fourteen pit houses underlying the pueblo resulted in the naming of a second phase, the Willow Creek, dated by intrusive pottery at about 1150-1200 A.D. This phase was characterized by shallow, almost square pit houses, off-center hearths, plaster lined mealing bins, step side entrance, and sub-floor storage pits. Pottery was again abundant, including 48 restorable vessels, with corrugated types the most common, associated with such painted wares as McDonald Corrugated, St. Johns Polychrome, and Whipple Black-on-white. Stone and bone implements were less common than in the pueblo, but in general were quite similar. Although it is unusual to find pit houses dating as late as the close of the twelfth century, Wendorf indicates that others have recently been found not far distant in New Mexico. It might be mentioned here that similar ones also occurred at Kinishba.

This report represents a valuable and welcome contribution to Southwestern archaeological studies, and the reviewer finds very little with which he can take issue. However, there are a few references to the excavations and materials from Kinishba that require clarification or amplification. Wendorf states (p. 50) that the most common variety of painted pottery at Kinishba was Gila Polychrome, giving as reference a 1934 manuscript of the reviewer, although further excavations at Kinishba, as shown partly by later references (Gordon C. Baldwin,

"The Pottery of Kinishba," *The Kiva*, Vol. 3, No. 1, pp. 1-4, Tucson, 1937; Gordon C. Baldwin, "The Material Culture of Kinishba," *American Antiquity*, Vol. 4, No. 4, pp. 315-16, 1939) and partly by unpublished material, indicate that Four Mile Polychrome was the most abundant decorated type. In his statement concerning Kinishba Polychrome (pp. 48-9) he does not refer to the first complete published description of this type. (Gordon C. Baldwin, "A New Pottery Type from Eastern Arizona," *Southwestern Lore*, Vol. 4, No. 2, pp. 21-6, Gunnison, 1938.)

Although the inference is repeatedly made that the Point of Pines phase is later than Kinishba, it seems to the reviewer that at least a part of Kinishba was also occupied into the fifteenth century. This is determined from the occurrence of such late pottery types as several varieties of Four Mile Polychrome, Showlow Polychrome, Kinishba Polychrome, Arauca Polychrome, Hawikuh Glaze-on-white, Pinnawa Polychrome, and Jeddito Black-on-yellow, and is based chiefly on material and information that was not available to Wendorf.

This is an extremely useful report and represents a very distinct addition to our increasing knowledge of the prehistory of the southwestern United States. Further reports of excavations in these and other phases of this complex and important area will be eagerly awaited.

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The Archaeology of Two Kern County Sites: The Archaeology of Site Ker-74. F. A. Riddell. *A Cave Burial from Kern County.* R. F. Heizer. Reports of the University of California Archaeological Survey, No. 10. The University of California Archaeological Survey, Berkeley, California. n.d. [1951]. Pp. 36, 2 plates and 5 figs.

The first paper is a report on an historic Yokuts cemetery west of Delano, Kern County, California. The site had been leveled in preparing the land for farming and the data and artifacts were salvaged by a number of local residents interested in archaeology. Mr. Riddell interviewed those who had witnessed the leveling of the site and studied the artifacts which were salvaged. Nine burials out of a possible 100 in the site are reported on in some detail from the interviews. There were a number of articles of European manufacture which dated the site, "from about the end of the 18th Century to about Civil War times."

The second paper is a report on a cave burial found in 1903 in a cave in a clayey cliff on Kern River about 10 miles east of Bakersfield, California. The find was investigated by C. Hart Merriam and the details are here reported on from the files of the C. Hart Merriam Collection at the University of California. The burial and accompanying artifacts are in the U. S. National Museum, Washington, D.C. The remains were of a 12 year old child placed in a conical, flat bottomed coiled basket. There was also a rabbitskin blanket, a small coiled basket and tule matting. A carrying net was also found but it was not included in the National Museum accession. The burial dates from the late prehistoric. The site is in Yokuts territory. Two other child burials in caves have been found in California.

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Ipiutak and the Arctic Whale Hunting Culture. Helge Larsen and Froelich Rainey. American Museum of Natural History Anthropological Papers, Vol. 42. New York, 1948. 276 pp., 60 figs., 101 plates. $10.00.

A report on the archaeology of an area in which an Eskimoan language is spoken begs for a breath of life on the bones and stones. Larsen and Rainey have used two devices to encourage the reader to visualize Ipiutak as a village in which artifacts become objects in use. First, they have sketched in the Point Hope Tikerarmiut and their inland, mountain-and plateau-dwelling, neighbors, the Nunatarmiut. Next, they have sliced back through time to divide all Eskimos, past and present, into two sorts of people and culture. On the one side stand the whalers—the living Tikerarmiut, the Punuk people, and the Old Bering Sea people; on the other side the non-whalers whose faces turn inland—the Nunatarmiut, the Kobukers, and the Ipiutakers. Having minimized cultural change in this essential dichotomy, the authors then draw the Ipiutak ruins into focus as a living village, and re-define Eskimo developments.

The framework for re-definition is that earlier advanced by Steensby, at least insofar as terminology is concerned. Ipiutak thus becomes a manifestation of "palae-Eskimo" as contrasted with the Arctic Whale Hunting culture, or "neo-Eskimo." The palae-Eskimo are not necessarily older than the neo-Eskimo, for their roots are in Siberia north of Bering Strait—in some sort of inland culture based on reindeer hunting. "The Ipiutak culture has so many affinities with Siberian culture that we must assume that it has not flourished long on American soil" (p. 183). Once in America, however, the neo-Eskimo have spread over the coastal areas already inhabited by the palae-Eskimo.

Based less on theory than on recent archaeological evidence of a most tangible sort, this bold departure forces us to reappraise the whole problem of Eskimo origins and distributions—perhaps even our concept of the term "Eskimo." The new interpretations are presented with clarity and readability that are welcome in a scientific report.

Whether or not the sharply-drawn distinctions between palae-Eskimo and neo-Eskimo in the present sense can withstand the tests to which they will be subjected by archaeologists and ethnologists, the Ipiutak discoveries will remain integrated in theory and also in the careful delineations of the material aspects of the site. Descriptive matter of a detailed nature is largely borne by the

legends opposite the 100 photographic plates. This leaves the authors free to combine their textual descriptions into compact essays built about the functions of a trait or a complex. Line drawings support the text.

As to the site itself, Ipiutak was spectacular from the time of its discovery. Into the picture of mound-searching northern archaeology, the stratigraphic sequences of which were seldom interrupted by house floors, suddenly appeared this ancient village of nearly 600 house pits on the rims of old, flat beaches. Some of the village had presumably disappeared into the encroaching sea. Were these houses occupied all at once? Unlikely though it appears in terms of populations, this remains a possibility, for the pits have spaces between them, and no two have been found to overlap. Added to the complexity are 138 excavated burials, some multiple, which include fanciful, specially-made grave goods and such elaborations as the insetting of ivory eyeballs with jet pupils. An emphasis at Ipiutak on skillful and delicate handling of flint techniques, the several ways of insetting series of side-blades, a distinctive curvilinear engraving art incorporating some realism, and absences of such traits as ground slate blades, pottery, and oil lamps, further set Ipiutak apart from other Arctic sites. Indoor fireplaces, extensive use of antler, and the presence of birch-bark utensils give the site an inland slant.

Although these and other features of Ipiutak served to distinguish it from early coastal finds already on record, a large number of culture elements widely distributed in the Eskimo area excluded the possibility of a culture entirely removed from its environmental background. However distinctive the form might be, the object could nearly always be identified as to use in terms of Eskimo material culture. Thus, arrow heads of antler might be studded with thin chert side-blades and still be identified as part of the landhunting complex of the Eskimo. Some objects, such as sewing needles, flint scrapers, brow bands and bird spear side prongs, differed hardly at all from those to be found in every coastal site from Cook Inlet to Greenland.

The greatest number of close parallels with Ipiutak were to be found not in the later Eskimo cultural sequences, however, but in the earliest phase on St. Lawrence Island—"the Okvik phase of the Arctic Whale Hunting culture." If Okvik marked the previously recognized simpler base for Old Bering Sea elaborations, then Ipiutak might be considered as still earlier than any of the cultural phases of Eskimo prehistory. On the other hand, the authors found unmistakable instances of stylistic identity between Ipiutak and Okvik engraving art such as might have resulted from direct contact or indirect trade. These and a single knife blade of wrought iron gave them pause in assigning dates of priority to all else in the area.

Still another feature of the Point Hope sequences had to be reckoned with in an estimate of temporal and cultural relationships. This was the presence of a few isolated middens, houses, and graves of a complex of traits very similar in some respects to those of the Ipiutak sites, but containing stone lamps, a few pieces of a thin, hard pottery of a sort previously unknown in the area, and other traits generally like those of Ipiutak, but simpler. This complex received the name "Near Ipiutak."

In the absence of a single clear-cut instance of stratigraphic superimposition of Near Ipiutak with Ipiutak, this phase of culture caused more speculation than did any of the other definitely later manifestations in the area. A "Birnirk" phase could be identified in terms of the Point Barrow site. Following Birnirk could be set up a "Western Thule" and a "Tigara" phase to correspond with sequences along the Kobuk River. However, Near Ipiutak had to be considered on its own merits. The weight of evidence seemed to be in favor of Near Ipiutak's representing an addition of later traits to the Ipiutak base, and the phase was allocated to a place between Ipiutak and Birnirk in the regional sequence. Larsen and Rainey clearly indicate their puzzlement, however, that this ". . . picture is confused by the fact that harpoon heads, apparently more primitive than the Ipiutak heads, seem to belong to the same culture stage as whaling harpoon heads, stone lamps, pottery, and ground slate, which we consider post-Ipiutak" (p. 168).

Subsequent excavations in western Alaska have clarified this problem with respect to the broader background of Near Ipiutak. This now appears to be a widely represented culture with continuity all the way from Seward Peninsula southward to the Alaska Peninsula. The "middle" levels in a tri-cultural site at Cape Denbigh are closer in content to Near Ipiutak than to Ipiutak, and may be more nearly related to the earliest Aleutian cultures than to Ipiutak.* Radiocarbon dates, on the other hand, show that the middle levels at Cape Denbigh are older than Ipiutak proper at Point Hope. The estimated mean dates for an upper and a lower section of the middle deposits of the former site are 1460 and 2016 before present, respectively, while an Ipiutak date from Point Hope, and another from Deering are 972 and 912 B.P. This seems to mean that Near Ipiutak at Point Hope was the extension of a culture that was established for a long time on the American shores of Bering Sea. Whether or not Near Ipiutak and Middle Denbigh were contemporary remains to be seen. The absences of pottery and lamps at Ipiutak, not to mention the presence of old-fashioned flint work there, indicate the whole cultural background of this site to have been sharply distinct from that of any culture that differs from it in these respects, regardless of age of a specific site. "Near Ipiutak" may be therefore an unfortunate name for a culture only the fringes of which are represented at Point Hope.

On the rather shaky base of the few carbon dates so far recorded, Ipiutak could be either the isolate of a prepottery culture whose bearers were remarkably conservative, or the village of a truly foreign group whose lifelines with northern Siberia (as actually indicated by similarities to Scytho-Siberian art forms) were as yet un-

* The possibilities of a relationship between any of these aspects and the "Denbigh Flint Complex" are too remote to consider here.

broken. ". . . The region around the lower Ob and Yenissei may be the original home of the Ipiutak people" (p. 183). We anxiously await Dr. Shapiro's report on the Ipiutak and other Point Hope skeletal material for further light on these matters.

The Ipiutak report has presented us with a wealth of detail concerning a form of culture that is isolated and rounded out with more of the intimations of human society than we are accustomed to receive from Arctic excavations, and it has raised new questions of origins, and of the relation of Eskimo problems to those of the broader circumpolar region.

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The Wulfing Plates—Products of Prehistoric Americans. VIRGINIA DREW WATSON. Washington University Studies, New Series, Social and Philosophical Sciences, No. 8, St. Louis, 1950. 95 pp., map, 10 plates, 3 figures, 3 tables, bibliography and index.

In 1907, eight repoussé (technically, embossed) copper plates of prehistoric aboriginal manufacture representing winged figures were plowed up on a farm 2½ miles south of Malden, Dunklin Co., Missouri. No association of a grave or other artifacts was noted at the time. The plates were purchased the following year by J. Max Wulfing and donated to Washington University, St. Louis, where they came to the attention of Gerard Fowke, who described the find briefly in his "Antiquities of Central Southeastern Missouri" (Bull. 37, B.A.E., 1910). Since then, the plates have been referred to repeatedly. Mrs. Watson has undertaken to provide the first detailed study of the Wulfing plates, including the technique of manufacture, probable source of material, and cultural relationships, particularly relationship of the plates to the "Southeastern Ceremonial Complex."

Spectographic qualitative analysis by cathode layer revealed a remarkable degree of purity in the copper, suggesting a source in Upper Michigan. Although metallographic analysis was inconclusive in defining the method of beating out the copper, indications were that annealing was not used and that the native copper was subject only to cold hammering. Considerable piecing together by riveting characterized the plates.

The Wulfing specimens are "Eagle" plates, either naturalistic animal representations or, in one case, anthropomorphized. Meticulous descriptions and excellent photographs of each plate, as well as line drawings to show the details of riveting, facilitate interpretation. Thus, it is possible to make detailed comparisons with other copper plates, notably from Spiro, Moundville and Etowah.

Descriptions of the plates are followed by a general discussion which includes brief but significant ethnohistorical data, notably the early 19th century missionary report quoted by Swanton: "Muscogee (Creek) tradition affirms that there were more of these plates preserved by them in former periods . . . but that the number was diminished by the custom of placing one or more of them with the body of a deceased chief of the pure or reigning blood."

Three additional chapters of discussion deal with the "Southeastern Ceremonial Complex" in its various component sites and a final chapter of summary and conclusions ably presents the total knowledge to 1950 of the subject. Unfortunately, results of the Spiro C-14 testing was not available at that time; otherwise the estimated dating of 1200-1400 A.D. might have been placed considerably earlier. Mrs. Watson's painstaking analysis and well-developed comparative summary represent a substantial contribution to research on ceremonial trait influences reaching the United States area from Meso-America.

Incidentally, in speaking of the "Southeastern Ceremonial Complex" the author resorts to the proposed use of "Scerco." In this day of telescoped terminology, the device is fashionable but confusing. Scerco may take its place in the esoteric language of the initiated, but the long version says what it means—to anybody.

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The Carlson Annis Mound, Site 5, Butler County, Kentucky. WM. S. WEBB. Reports in Anthropology, University of Kentucky, Vol. VII, No. 4, Lexington, 1950, pp. 267-354. 75 cents.

The Read Shell Midden, Site 10, Butler County, Kentucky. WM. S. WEBB. Reports in Anthropology, University of Kentucky, Vol. VII, No. 5, Lexington, 1950, pp. 355-401. $1.00.

When a WPA archaeological survey program was initiated in Kentucky in 1937, the important revelations of the shell heaps in North Alabama along the Tennessee River demanded that similar sites on Green River in Western Kentucky be examined. These two publications represent very nearly the last of the reports on these Archaic shell heaps, all others having been described previously. These papers continue certain highly commendable practices of the author but also continue to tantalize certain students by patent omissions.

In the factual data section of the reports twenty-two pages are given over to tabular descriptions of the burials and their associations although it is pointed out that only 20 burials of 247 at Bt 10, the Read Site, had burial furniture of intentional inclusion, and only 43 of 390 at Bt 5. The author attaches most importance to the atlatl weights found in such association. Since Peabody first suggested that an antler hook which he found in a mound in Mississippi in 1901 was an atlatl hook, there has been great interest shown in the artifact assemblage that seems to serve as spear-thrower parts.

Several new features of the atlatl story such as "geniculate bannerstones" are added by the Bt 10 finds. Of intriguing interest is a section on *The Mechanics of the Atlatl*, written exactly as would be written by a physicist who is also an archaeologist. Perhaps some of the real flavor of this article is lost in setting it down in print, but this would be apparent only to personal friends of the author. I think every student of American archaeology should read this section.

Although this is not mentioned in the report, Bt 5 is one of the sites dated by Libby and Arnold by carbon 14. Two samples from the 6.5-foot level, one of shell and one of antler, gave dates of about 4900 years ± 250, or about 3000 B.C. This is most gratifying. Most Eastern archaeologists have long felt that the Archaic was much older than accepted dates. It is not known where Bt 5 might fall in the whole Archaic sequence, but Webb considers Bt 10 late Archaic and thinks Bt 5 was occupied into late Archaic times.

A special chapter in the Carlson Annis mound report is a study of *Evidence of the Use of "Medicine Bags."* It gives a lucid explanation for the occurrence at Bt 5 of some rather unusual burial furniture, viz., such articles as fish vertebrae, rabbit and ground hog mandibles, bobcat foot bones, and rostra of such forms as mink, marten and bobcat. Of 390 burials at Bt 5 nine had accompanying material interpreted as "medicine bag" parts or contents; fifteen had atlatl remains. Thus "medicine bags" appear to be relatively important. This chapter compares similar material from Indian Knoll.

The Carlson Annis mound report includes the first step toward an analysis of projectile points from the Archaic of Kentucky. It is regrettable that this study was not more comprehensive but it presents the material in a quite usable form. There are several tabulations of depth distribution of various stone artifacts and since no conclusions were drawn from them it may be hoped that these will be treated in a yet-unpublished general report on Archaic.

To the casual reader or new student of American archaeology, these reports may appear to be sketchy in the treatment of some portions, such as feature description, excavation methodology, or conclusions. However, it should be pointed out (and Webb does so) that these have been most adequately treated in previous publications, and it would be only repetitious to describe them anew in each of these two studies. If these are the final reports to appear on excavations of Kentucky Archaic sites, a general account with some comparative study seems obligatory. It is hoped that this is planned for the future; this reviewer and other friends of Webb have sought for some years to encourage him in this endeavor.

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A Study of Classic Maya Sculpture. Tatiana Proskouriakoff. Carnegie Institution of Washington, Pub. 593, Washington, 1950, xi, 209 pp., 111 figs.

The most encouraging recent signs that Middle American archaeology is at last coming of age, anthropologically speaking, are the last two publications of the Carnegie Institution of Washington in this field: Thompson's *Maya Hieroglyphic Writing* and Miss Proskouriakoff's important volume on Maya Classic sculpture. In reading the general and theoretical anthropological literature of the past four years or so, one is impressed by the dearth of Middle American archaeological data cited even as illustrative material. As others have wondered before me: Why has this so often touted "perfect laboratory" for research in human relations and culture actually contributed so little material useful to anthropology? The kindest explanation is that synthesis and interpretation have only recently become possible.

Writers of future anthropology texts and theoretical monographs, if they have not completely (and understandably) fallen out of the habit of consulting Middle American archaeological literature for useful data, will find Miss Proskouriakoff's book a rich source of such material, particularly in aspects of culture change as reflected in art.

The opening paragraphs of this volume lead one to believe that only another minute chronological study is offered, so let me urge all to read at least the short section on aims in Chapter 1 (Introduction), the sections on basic assumptions in Chapter 2 (Methodology), and all of Chapter 7 (Conclusions). Middle Americanists should add to this minimum reading the "Results" in Chapter 2.

The book begins with its statement of purpose: To examine variations in the Classic monumental style to obtain clues to the relative dates of execution and to discover progressive changes which characterize the development of typical Classic Maya forms depicted on stelæ. The method assumes that the selected dates recorded represent the chronological order of the monuments, and that no preconception of a "necessary" or "natural" stylistic progression should be permitted to contradict it. Chapter 2 relates the difficulties in methodology which any such study encounters, and the author's steadfast attempts to keep her analysis on as objective a plane as possible. The reader settles down for just another exercise in chronological method.

Originally, it was Miss Proskouriakoff's "deliberate intention" to avoid any consideration of aesthetic values and artistic qualities or mannerisms, because, as she feared, they are intrinsically difficult to determine. She soon recognized the fact, however, that this approach was inadequate; that the most significant criteria of time were abstract form, line, arrangement, and composition, qualities of the whole design that affected simultaneously all elements in it. Thus, while attempting to confine her trait lists to variations which could be stated in explicit terms, she saw that perception of

the harmony of changes, largely aesthetic and subject to personal judgment, played some part even in the selection of traits used.

The most conspicuous and sensitive changes, Miss Proskouriakoff found, lay not in the selection of definable forms or motifs, but in the artist's approach to his subject, in the direction of his attention. "In other words," she writes, "the significant change was in the artist, not in the subject of his art." In general, the tendency within the Classic style was toward more complex organization of the pattern, followed by the opposite trend of disintegration. With the Late Classic period, the artist's attention shifted from the frame of reference contained in the religious theme to a wider field in which objects were regarded not only as symbols but also as interesting "natural" phenomena; his attitude, as Miss Proskouriakoff expresses it, became more detached from the religious content of his work, more intellectual and analytical. Through the period of the "Ornate Phase" she found a progressive elaboration of "artificial rhythmic modulations in line and in relief superimposed on the conception of objects as merely physical entities."

The awareness of this "metaphor between form and the emotions" led to attempts to express the perfect regularities of nature, such as gravity, balance, and motion. "Such laws are expressed in art long before science is aware that they exist," says Miss Proskouriakoff; this is one of the few statements in the book that needs clarification through further definition of terms. If the artist has become aware of nature's regularities, through processes of accurate observation and logical reasoning, is he not thereby automatically a scientist, too? Science can find expression through the symbolism of art as well as speech or writing.

At the risk of misinterpreting Miss Proskouriakoff's meaning, I hazard the opinion that she intends to point out either (1) that experimentation in art may lead to recognition of certain natural regularities or laws before, let us say, astrology or magical curing do; or (2) that science (deliberately?) finds expression through the symbolic medium of art before it is recorded in other media by sub-groups of society that call themselves astronomers or mathematicians, or physicists, and so on. This may be no more than a quibbling over terms, but I am puzzled as to which meaning, if either, Miss Proskouriakoff intends. She considers the creation of this order in complexity, particularly in the Dynamic phase of Maya art, one of mankind's great intellectual achievements.

In contrast, the author does not lightly term the next development the "Phase of Decadence" without defining her terms. Although, as she points out, we cannot appraise the spiritual effect of religious suggestion in the design until we know more about its symbols, "it is easy to perceive that the frame of reference to normal physical effects is neglected."

Space here does not permit an adequate selection of Miss Proskouriakoff's conclusions and observations, nor an account of the detailed analyses and graphic presentations which comprise most of the volume. I can assure the non-Middle Americanist, the non-archaeologist, indeed all students of art and of art's role in culture change, that they will find a reading of this book most rewarding. Even though little is said concerning the symbolism of Classic art, "because it is in itself a complex field of study which cannot be lightly undertaken," the author specifically states and displays, throughout, her awareness that an art development cannot be fully understood except in its total cultural context. While this may seem an elementary attitude to professional anthropologists, it is one rarely encountered in the field of Middle American prehistoric art analysis. For the *Handbook of Latin American Studies*, I have perused some dozen or so articles, booklets, and monographs on Middle American pre-Columbian art, written during the last two years; most of them ignore even the fundamental facts of ethnic and chronological setting; in none of them has the author rolled up his sleeves and pried into the bewildering maze of detail that Miss Proskouriakoff has so thoroughly and masterfully selected, set in order, and analyzed; and no one has so far achieved her delicately balanced yet profound sensitivity to the conceptual as well as historical implications of her materials.

In a field notorious for specialized art idiom and lush phraseology, Miss Proskouriakoff writes coherently and in straightforward style. I find it all but impossible to paraphrase her conclusions without damaging the content as well as the facility of her expression. Finally, as has become somewhat of a habit with me in reviewing Carnegie Institution publications, I deliberately use valuable space in calling attention to the consistently high standard of editing under the direction of Margaret Harrison. The present volume is no exception. I do this because good editing, reflected in format, illustrations, good writing, clean of distracting typographical errors and crossed-up figure references, is not merely desirable but essential to the successful presentation of any scholarly contribution.

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An Archeological Reconnaissance in Washington County, Utah. Jack R. Rudy and Robert D. Stirland. University of Utah Anthropological Papers, No. 9, Salt Lake City, Utah, April, 1950. 66 pp., 9 plates, 5 figs.

This little bulletin is doubly welcome since it represents not only an excellent report of an archaeologically little known area but also because it marks the revival of the technical series of the Department of Anthropology, University of Utah.

The report presents the results of a survey by Messrs. Rudy and Stirland, graduate students of the University of Utah, of selected areas in the extreme southwestern corner of Utah, with particular emphasis on the

regions to be flooded by two proposed reservoirs, one, the Virgin City, on the Virgin River, and the other, the Gunlock, on the Santa Clara River. A total of 73 sites were recorded, of which approximately half will be endangered if these two reservoirs are constructed. Although the majority of these sites consisted of small campsites, rock shelters, or rock ring areas, there were a number of relatively large villages of slab-lined or rock-outlined houses. Small test excavations were made at nine of the larger sites in order to determine architectural features and relationship between sites.

From the survey collections and test excavations the authors correctly conclude that the area was closely related to the San Juan culture of the Anasazi. Architecture suggests the following periods: Modified Basketmaker, early Developmental Pueblo, and late Developmental Pueblo, while pottery indicates primarily Developmental Pueblo and the early Classic or Great Pueblo period. However, abandonment of the area probably came in the latter period rather than in the late Developmental Pueblo period as the authors suggest (p. 10).

Further, in a comparison of the architecture, pottery, and other cultural manifestations, no attention was given to the area that is geographically and culturally perhaps more closely related to this Utah area than any other. This includes the lower Virgin and Muddy or Moapa River valleys in eastern Nevada. For example, no reference is made to the extensive work of Harrington [1] in that area, nor to the surveys of the reviewer [2] and of Hall [3] to the east. Pottery types in the Muddy River area of Nevada are identical with many of those described in this report. It is strange that some Sosi Black-on-white did not occur in this southeastern Utah area, since this is one of the chief intrusive types lower down the Virgin River and on the plateaus to the east.

By way of a minor correction, Boulder Gray and Boulder Black-on-gray do not belong in the Patayan series, as indicated on p. 45, but should be placed in Moapa (Pueblo) Gray Ware.[4] In addition, type descriptions of Eldorado Gray and Searchlight Brown are not found in Colton, 1939, as indicated on p. 45, but in the reviewer's 1948 manuscript, a copy of which was available to the authors of this report.

From the design and appearance of the effigy jar illustrated in Plate VIII, A, labeled Tusayan (Virgin) Black-on-white, this vessel, in the reviewer's opinion, represents an intrusive Dogoszhi Black-on-white specimen. The design of this latter type is composed almost exclusively of some variety of hachure, while the design of Virgin Black-on-white consists mainly of medium to broad-lined styles. As the authors correctly state, there has been considerable uncertainty about Virgin Black-on-white. However, Dr. Colton and the reviewer spent considerable time some ten years ago reworking and revising descriptions of this and other southeastern Utah and southern Nevada pottery types. Unfortunately, most of this material has not yet been published, and consequently the information was not accessible to Rudy and Stirland.

Included in the report is a section listing the sites within the proposed reservoirs recommended for further work in the event these dams are constructed. A number of the sites outside these two areas are also recommended for testing or excavation in order to secure sufficient information and material to outline the prehistory of this region.

Two appendices complete the report. The first, by John L. Eames, presents a brief description of the single burial uncovered, and the second lists in considerable detail the equipment taken on the expedition. This latter should be of interest and value to those conducting similar surveys.

This concisely written report adds a great deal of important data on an area in southwestern Utah about which little had previously been published.

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The Tovar Calendar. George Kubler and Charles Gibson. Memoirs of the Connecticut Academy of Arts and Sciences, Vol. XI. Yale University Press, New Haven, Conn., 1951. 82 pp., 18 figs., 14 plates. $6.00.

The Tovar Calendar fills the eleven concluding folios of a bound MS in the John Carter Brown Library, Providence. A Mexican calendar, dated by Kubler and Gibson 1585-87, it names the aboriginal months (starting with Tlacaxipeualiztli), attempts a correlation with the Gregorian calendar, and describes the ceremonies or comments upon the significance of each of the twenty months and the five barren days. As Tovar handled it, it shows relationships between the Sahagun and Motolinia codifications. Illustration or picture writing was the work of perhaps two native informants; the text was presumably written by the Mexican Jesuit, Juan de Tovar (c. 1543-1626). Whether data relate to Texcoco, Tula, or Tepotzotlan does not appear.

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[1] M. R. Harrington, *Archaeological Explorations in Southern Nevada*, Southwest Museum Papers, No. 4, Los Angeles, 1930; M. R. Harrington, "A Primitive Pueblo City in Nevada," *American Anthropologist*, Vol. 29, pp. 262-277, 1927; these represent only two of Harrington's numerous papers on surveys and excavations in this region.

[2] Gordon C. Baldwin, "Archeology in Southern Nevada," *The Kiva*, Vol. 7, No. 4, Tucson, 1942; Gordon C. Baldwin, "An Occurrence of Jeddito Black on Yellow Pottery in Northwestern Arizona North of the Grand Canyon," *Plateau*, Vol. 17, No. 1, pp. 14-16, Flagstaff, 1944; Gordon C. Baldwin, "Notes on Ceramic Types in Southern Nevada," *American Antiquity*, Vol. 10, No. 4, pp. 389-90, April, 1945.

[3] E. T. Hall, Jr., *Archaeological Survey of Walhalla Glades*, Museum of Northern Arizona, Bulletin 20, Flagstaff, 1942.

[4] Gordon C. Baldwin, "Archeological Surveys and Excavations in the Davis Dam Reservoir area," ms., Lake Mead Recreational Area, National Park Service, Boulder City, Nevada, 1948.

The whole bound volume of sixteenth-century Colonial Mexican Mss is probably in the hand of Tovar. Preceding the Calendar is an exchange of letters between him and Jose de Acosta and a copy of his only other extant work, a second version of his *Relacion del origen de los yndios*. A condensation of Duran, it is now better known as the *Ramirez Codex* (*c.* 1583). The Calendar and the *Relacion* were delivered to the Jesuit historian Acosta, who used the latter but not the former in his *Historia natural y moral*. Kubler and Gibson here publish the Calendar and the Tovar-Acosta correspondence for the first time.

Unique in this work is a disclosure of details of observances in the Aztec months or festivals, some of which, as Kubler and Gibson point out, are found nowhere else. New data appear for the feasts of Tlacaxipeualiztli, Toxcatl, Teotleco, Quecholli, and the Nemontemi. Etzalqualiztli, Panquetzaliztli, and perhaps others are freshened with new and penetrating interpretations. The authors incline to credit much of this to the local diversity reflected in Tovar's very acute and observant informants.

Much is contributed too by discussions of correlations of Central Mexican calendric systems with the Gregorian calendar, and the clarification of the many differences between what may be termed the Sahagun and Motolinia traditions. Kubler sees these as attempts to codify Central Mexican calendars, and finds them a continuation of pre-Conquest attempts to make uniform a number of calendric systems which varied in starting point, sequence, nomenclature, and the like, depending upon agricultural and other peculiarities of different regions.

Also of interest is Kubler's apparent suggestion (pp. 48-51) that such a study of calendric systems might be used to distinguish "schools of writing," geographic distribution of a number of traits, or even chronological variation. A number of such propositions and questions link this work to Paul Kirchhoff's recent study, "The Mexican Calendar and the Founding of Tenochtitlan-Tlatelolco" (*Transactions*, N.Y. Acad. Sci., Ser. II, Vol. 12, No. 4, 1950), in which solutions to chronological discrepancies may have had some bearing upon Kubler's approach.

The handlist of annotated relevant sources (Mss, codices, published works, archaeological evidence), though specialized to the present subject matter, is likely to be of more general use and inspiration. A twenty-page section of halftones, including facsimile reproductions of the Tovar Calendar, and a bibliography of some 200 titles end the memoir.

The work is clearly and carefully presented, and the conclusions of the authors seem unexceptionably sound. The student may wish for more specific information on the coloring of the calendar, which might be significant, and may find the authors' translations of some of the Aztec month names unduly free or sometimes inexact. These are comparatively minor points, and the work is a valuable reference, whose importance is wider than the field it covers.

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The Archaeology of Coastal New York. CARLYLE SHREEVE SMITH. American Museum of Natural History, Anthropological Papers, Vol. 43, Part 2, New York, 1950. 105 pp., 5 tables, 15 plates, 3 text figures.

This important study, submitted in 1949 by Carlyle S. Smith as his doctoral dissertation at Columbia University, is concerned with that portion of southeastern New York which lies between New Jersey and Connecticut and includes Long Island. Adding to the utilizable data of prior investigators, chiefly Skinner, Harrington and members of the Long Island Chapter of the New York State Archeological Association, the results of excavations conducted by Ralph S. Solecki, Martin C. Schriener and himself, the author confirms the previously recognized existence of a preceramic and ceramic horizon and succeeds in establishing a cultural sequence which parallels that determined by the reviewer for inland New York and is similarly divisible into four major periods. He develops his theme with consistent cogency, clarity and conviction.

Approaching his subject with an historical and ecological perspective, Smith considers first the scanty data relating to the ethnology and history of the Algonquian-speaking tribes encountered by the early seventeenth century Dutch and English explorers and colonists, sketching from the documentary sources their general way of life in simple societies of semisedentary shellfish gatherers, farmers, fishermen and hunters, and their early acculturation at the hands of trade—and land-hungry Europeans. He also succeeds in providing the first satisfactory evidence linking archaeological manifestations with historic tribes in the Coastal region of New York and Connecticut.

His taxonomic scheme, outlined in Appendix A and developed in the main corpus of the report, recognizes two patterns of culture, the Woodland and underlying Archaic. I believe that Smith could have found ample justification for designating as Laurentian the unnamed phase of the latter pattern. Within the former he differentiates two phases, the Northeastern and the Coastal, each characterized by several aspects and foci, supported by a varying number of components. Most of the foci are interpreted as developmental stages within the respective aspects rather than as mere taxonomic units.

In this succession Smith traces the history of change and interaction of two major ceramic traditions which he calls respectively the East River (aspect) and Windsor (aspect). The East River aspect, comprising the Massapeag, Rosenkrans, Clasons Point and Bowmans

Brook foci, all of the late Prehistoric and Historic periods, appears to have an intrusive basis in the western half of the area, and to have

its closest parallel in central New York, where the Owasco aspect is followed by the Iroquois aspect. In the occurrence of certain ceramic traits, the Bowmans Brook focus suggests the Canandaigua focus, the earliest stage within the Owasco aspect. The earlier components of the Clasons Point focus have certain ceramic traits which resemble some in the Castle Creek focus, the closing stage within the Owasco aspect. The later components of the Clasons Point focus and the single component representing the Massapeag focus share additional ceramic traits with both the Castle Creek focus and the Iroquois aspect (p. 152).

Smith's newer analysis thus confirms the reviewer's observations on ceramic trends in the Coastal area published in 1944 (p. 104).

The Windsor tradition, comprising the Niantic, Sebonac, Clearview, North Beach, and Orient foci, appears to be basically related to the underlying preceramic Archaic horizon, as judged by a comparison of the stone industry of the Orient and North Beach foci.

Ceramically, the [developing] Windsor aspect seems to have received [successively] diffused traits from contemporary cultures to the west and north, such as the Brewerton focus, the Point Peninsula focus, the Adena aspect, the Hopewellian phase, the Castle Creek focus and the Iroquois aspect. On the coast it was influenced by the East River and Shantok aspects. An origin toward the south is suggested in the brushed-surface finish which is characteristic of the Chesapeake-Potomac pottery illustrated by Holmes. Fabric-marked pottery and the grooved ax also suggest southern affinities (p. 152).

With these conclusions the reviewer has long been in general agreement. On the earlier level the now recognized four successive foci of the Point Peninsula aspect appear to have been the principal contributors to the Windsor ceramic tradition. Recent work in eastern New York, especially in the Mohawk and Hudson valleys, has revealed the continuous distribution from central New York to the tidewater area of most of the pottery types associated with the several stages of Point Peninsula development.

In the Intermediate period the Windsor aspect was distributed over the entire area east of the Hudson surrounding Long Island Sound. At the beginning of the late Prehistoric period, the carriers of the East River culture invaded the western half of the area, and the people responsible for the Windsor culture were relegated to the eastern half. At the beginning of the Historic period the bearers of the Shantok culture invaded eastern Connecticut and spread its influence to eastern Long Island, thus restricting the Windsor aspect to parts of central and coastal Connecticut. Translating this in terms of historic peoples, the ancestors of the Nehantic and probably of other Connecticut and eastern Long Island groups, identified above with the Windsor aspect, once inhabited the entire shore line of Long Island Sound westward to the Hudson and eastward to Martha's Vineyard and eastern Long Island. After several centuries of occupancy the western part of the area was usurped by people ancestral to the Wappinger Confederacy, the western Metoac and the Delaware, identified above with the East River aspect. The remnants of the people who were the carriers of the Windsor culture became isolated on eastern Long Island and in Connecticut where their mode of life changed under the influence of the intruders. Finally, another invading group, the Mohegan-Pequot, identified above with the Shantok aspect, came in from the northwest and reached the coast in Connecticut where they split the Nehantic into two groups. Cultural traits of the new invaders spread to eastern Long Island where the culture of the Corchaug and Montauk may have changed from Windsor to Shantok. In early historic times the distribution of the three major archaeological cultures, Windsor, East River, and Shantok, coincided with that of tribal groups who met the early settlers (p. 156).

The excavations of Smith and his associates were confined to sites of the ceramic period. However, some collecting was done on surface sites of the underlying preceramic horizon on Manhattan Island, western Long Island and the adjacent mainland. The resulting assemblages, consisting principally of a numerous category of chipped stone projectile points, suggest a main reliance on hunting by the earlier occupants, in marked contrast with their successors who were chiefly shellfish gatherers and horticulturists.

Smith relates this horizon to the Laurentian and Lamoka manifestations, but the evidence would seem to discount the Lamoka as a factor inasmuch as its most typical forms are wanting from most of eastern New York, while all of Smith's preceramic material, save the single specimen of the grooved ax, can be duplicated in stratified Laurentian series. His suggested dating for the Archaic horizon follows the guess dates in vogue at the time of writing. The chronology based on radiocarbon analysis has immensely altered the picture and it seems safe to predict that the further application of the method will also substantially extend downward Smith's temporal estimates for the earlier foci of the Windsor aspect.

Smith's treatment of ceramic typology constitutes the weakest part of his analysis. Much of this is probably due to the limited site samples generally available. Certain of his types seem open to question. It would seem, for example, that his North Beach Brushed, for which no rim sherds occurred (p. 196), should have been included with his tentative types. The creation of a new type (Vinette Interior Cord Marked) on the basis of a few minor variations in a series which is otherwise identical with an established type (Vinette 1) also appears unwise and productive of confusion (p. 195). It would have been more useful in demonstrating component and focal relationships to have employed typological ceramic seriation charts showing frequency and percentile distributions in place of the graphs and tables (Fig. 2, 3 and Tab. 2-4).

Smith has clarified and tied into the inland sequence the previously little known Coastal region of New York. His work constitutes a major contribution to the archaeology of the northeastern area. It is especially valuable considering the rapid destruction of the sources of information by the expansion of urban settlement on Long Island and for the significance it confers on the data collected by Skinner and Harrington. Of its essential soundness there can be no question. Further excavations are urgently needed to test certain of his hypotheses, for example, that the Orient focus is the mortuary manifestation of the North Beach focus, and to expand the often limited inventories.

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BOOK NOTICES

Genetics and the Races of Man. WILLIAM C. BOYD. Boston (Little, Brown, & Co.), 1950. xvii + 453 pp. 6.00. (Reviewed by Ashley Montagu in the *Saturday Review of Literature*, 17 February 1951; by Leslie C. Dunn in the *Scientific American* 183-6, December 1950; in Theodosius Dobzhansky, "Race and Humanity," *Science* 113 (2932): 264-265, March 9, 1951; by J. N. Spuhler in the *American Anthropologist* 53-2, April-June 1951. Vol. 9, reviewed by Joseph B. Birdsell in *American Journal of Physical Anthropology*, No. 2, June 1951; by A. E. Mourant in the *American Journal of Human Genetics*, Vol. 3, No. 1, March 1951.)

Principles of Human Genetics. CURT STERN. San Francisco (W. H. Freeman), 1949. xi + 617 pp. $7.50. (Reviewed by Theodosius Dobzhansky in the *American Journal of Physical Anthropology* 8-4, December 1950).

Races. A study of the problems of race formation in man. C. S. COON, STANLEY M. GARN, AND JOSEPH B. BIRDSELL. American Lecture Series No. 77, Springfield, Ill. (C. C. Thomas), 1950. xiv + 153 pp., 15 plates and 11 figs. $3.00. (Reviewed by J. Lawrence Angel in the *American Journal of Physical Anthropology* 8-4, December 1950; by Marshall T. Newman in the *Boletin Bibliografico de Antropologia Americana*, XIII (1950), Part II, Mexico, 1951, pp. 188-192; by Leslie C. Dunn in the *American Anthropologist* 53-1, January-March 1951; in Theodosius Dobzhansky, "Race and Humanity," *Science* 113 (2932): 264-265, March 9, 1951).

Genetics, Paleontology, and Evolution. A symposium edited by GLENN L. JEPSON, ERNST MAYR, AND GEORGE GAYLORD SIMPSON. Princeton University Press, 1949. xvi + 479 pp. $6.00. (Reviewed by S. L. Washburn in *American Journal of Physical Anthropology* 8-2, June 1950; by W. W. Howells in the *American Anthropologist* 52-4, October-December 1950).

The above-listed recent publications in physical anthropology are of importance to all who are concerned with the study of the history of mankind, as presenting modern concepts of evolution, human genetics, and human races.

A race of mankind is defined by Boyd as "a population which differs significantly from other human populations in regard to the frequency of one or more of the genes it possesses," defined by Stern as "a genetically more or less isolated division of mankind possessing a corporate genic content which differs from that of all other similar isolates," and by Coon and his collaborators as "a population which differs phenotypically from all others with which it has been compared" and as "a somatically unique population or collection of identical populations."

These are variously worded expressions of a fundamental concept in which the word "race" is, at last and properly, used in connection with *Homo sapiens* in the same way as it is used by zoologists of other animal species — referring to populations which are, or have been in the past, reproductively isolated, geographically or otherwise, sufficiently to become different from neighboring populations (cf. also Theodosius Dobzhansky, *Genetics and the Origin of Species*, Columbia University Press, New York, 1941). This is a refreshing change from the older and still widespread idea of a few sharply divided and immutable major groups into which all people had to be classified, with intermediate types ascribed to hybridism between these "basic races," actually imaginary or arbitrary, of the nature of Platonic ideal types; categories of oversimplified classification, rather than original varieties of the human species (see most of the selections by Dr. Earl W. Count, editor, *This is Race: an anthology selected from the international literature on the races of man*, New York—Henry Schuman, 1950, pp. 747, $7.50).

In biology, as a matter of fact, it is recognized that races, varieties, or subspecies, are generally arbitrary divisions for purposes of study, though expressing genuine concentrations in ranges of variation. This has been particularly clearly stated regarding birds: "Every local population is at least slightly different from every other. . . . The limits of subspecies are subjective . . . not a natural unit, though based on a natural phenomenon . . . subspecies may be separable on average characters. Populations, not individuals, are the units involved. A certain amount of overlap caused by individual variation . . . intergrading populations situated in intermediate areas" (A. L. Rand and M. R. Traylor, "The amount of overlap allowable for subspecies," *The Auk* 67: 169-183, 1950; cf. Dean Amadon, "The 75 percent rule for subspecies," *Condor* 51: 250-258, 1949; Ernst Mayr, "*Systematics and the Origin of Species*, Columbia University Press, 1942; T. D. A. Cockerell, "Birds and the species problem"—a review of C. B. Ticehurst, *A systematic review of the genus Phylloscopus*, British Museum, 1935 —*Science* 89: 537-538, No. 2319, June 9, 1939; and many other papers).

The symposium of 23 papers on *Genetics, Paleontology, and Evolution* is concerned largely with interpretation of zoological history in the light of modern genetic knowledge, and constitutes important general background material for attempts to understand the evolution of human species and races. The major points of specific interest for students of human biological history include the emphasis on natural selection as operating through the genetic structure of populations, and the dismissal of orthogenesis (which is not supported by paleontological evidence or by paleontologists; cf. Glenn L. Jepson, "Selection, 'orthogenesis,' and the fossil record," *Proc. Amer. Philos. Soc.* 93-6, December 1949, reprinted in *Yearbook of Physical Anthropology*—

.949, Viking Fund, New York, 1951); the discussion of phenotypes and homologies, and of the complexity and flexibility of gene patterns; the rates of evolution of races and species (cf. F. E. Zeuner, *Dating the Past*, London, 1946, pp. 378-380); and the process of speciation—the formation of species by the reproductive isolation, through geographical or ecological factors, of populations for long periods (50,000 to 500,000 years).

Stern's book is in part a textbook of the fundamentals and mechanisms of human genetics, and also discusses problems of race mixture and eugenics, with a little more inclination toward the eugenical point of view (as against purely cultural explanation of differences in personality and intelligence between individuals, classes, or groups) than most anthropologists nowadays.

Boyd presents a clear and concise discussion of genetic processes, and treats of the effects of environment on the phenotypic expression of genes, and the effects of inbreeding and hybridization; mutation, selection, adaptation, and "random genetic drift" in isolated populations; geographical barriers, climatic effects and adaptation in man. He then takes up concepts of race, the reality of species, man as a single polytypic species, and the formation of races as genetically defined. Boyd emphasizes blood-group types, his special field, and suggests a general classification into six major racial types, based primarily on blood groups (RH as well as MN and OAB) with which other characters seem to correspond fairly well: hypothetical "Early European," European or "Caucasoid," African (Negroid), Asiatic (Mongoloid), American Indian, and Australoid. A point of importance which Boyd brings out by clear implication is that blood types are non-adaptive, purely genetic traits, and hence far more meaningful and dependable than craniometry and skeletal materials. Other definitely traceable human genes, as well as those producing blood types, and the genetic basis of more complicated physical characteristics which have usually been utilized in studies of human racial types are discussed. In considering the racial history of man, Boyd rejects the idea that man's past can be reconstructed from the inadequate supply of fossil remains, and instead he develops hypotheses of human history—pretty reasonable, and generally more or less corresponding to ideas based on other considerations, but clarifying some of them considerably—from a survey of existing races and their probable relationships and geographical origins, using the blood groups as major guides. Probable biological future developments of man, and the ideas of eugenists, are interestingly and clearly discussed.

Coon, Garn, and Birdsell also discuss, very concisely and readably, ideas of race and the genetic basis of human heredity, but concentrate on adaptation to environmental factors and classify mankind into thirty racial types based frankly on phenotype. These they group into major racial stocks—Negroid, Mongoloid, White, Australoid, American Indian, Polynesian. Fossil man and human evolution are briefly discussed. Almost half the book is devoted to adaptive variations—body size, adjustment to altitude, skinny build in dry hot environment, short stature and fatness in extreme cold, adaptations to excess sunlight and heat (very dark skin, black eyes; probably tightly spiral hair and thickened tissues), to dry cold (flat fat-padded face, straight coarse sparse hair), to cool cloudy dampness (fair skin, light eyes, blondism). Selection for resistance to disease, and the effects of urban life, including protection from disease, are also treated.

The combination of Boyd's genetic approach, utilizing blood groups primarily for the determination of major stocks and fundamental relationships, with explanation of phenotypic races and their probable histories by adaptive variations in response to environment (through natural selection), as briefly discussed by Coon and his colleagues, should open the way for a clear and relatively complete history of the human species.

There are, however, a couple of heretical comments—ideas perhaps even more radical than those advanced in these books—which I have to offer. First, the Polynesians, not definitely placed by Boyd in any of his six major groups, are given as one of the six separate racial stocks of Coon, Garn, and Birdsell, but considered a mixture of Mongoloid and other elements. The blood-type evidence seems to suggest the classification of the Polynesians unquestionably with American Indians; Boyd, having deplored subjective classifications, nevertheless has himself been controlled by the ethnologists' dogma that the Polynesians came eastward into the Pacific from southeastern Asia, and has not brought out the possibility indicated by certain of his data that they, or at least a major element of Polynesian population came from America, like Thor Heyerdahl's party (but probably mainly from the northwest coast), meeting and mingling with other elements from Asia in the central western Pacific. Secondly, there are the South African Bushmen, barely mentioned at all by Boyd, listed by Coon, Garn, and Birdsell as one of their thirty racial types without commitment as to placement in a major stock. These are such a small number of people that they have often been largely ignored; most scholars have been hypnotized by the idea of three to six major "races" and they have had to explain the Bushmen away as hybrid of some kind. My impression is that they are so divergent in so many features as to be a separate major division, at least a racial stock, and perhaps could legitimately be considered a separate species even though cross-fertile with the rest of us.

Except perhaps for these points, which probably are not yet acceptable to either physical anthropologists or culture historians, a very clear and reasonable comprehensive general outline of human history is given by the combination of Boyd's reconstructions with those of Coon, Garn, and Birdsell.

And whatever the specific historical conclusions various students draw from the data, of greatest importance is the modern approach to the study of human races on a sound basis of genetics.

In this connection, the following is added from a recent circular announcement of the Society for the Study of Evolution (Ernst Mayr, President, American Museum of Natural History, New York 24, N.Y.):

"The study of evolution has entered in recent years a new phase. A better understanding of the processes of evolution has been reached through advances in the fields of population genetics, systematics, paleontology, anthropology, and ecology. Progress has been seriously retarded, however, through an extreme scattering of the relevant literature. The evolutionary findings of the specialist in a given field have often remained unknown to workers in other fields, and this has led to misunderstandings as well as to much duplication of effort.

"To fill the long-felt need for a publication devoted exclusively to the results of evolutionary research, the new journal, *Evolution*, was founded in 1947 as the official organ of the Society for the Study of Evolution. Both the journal and the society have flourished, and the latter now has a membership of nearly 1,000.

"The following titles, a few of the 77 leading articles published in *Evolution*, during its first three years of existence, will indicate the wide scope of its contents and the eminence of their respective fields of many of the contributors:

"Trend of Human Evolution," by Franz Weidenreich

"Suggestions as to the quantitative measurements of the rates of evolution," by J. B. S. Haldane

"On the roles of directed and random changes in gene frequency in the genetics of populations," by Sewall Wright

"Geography of Human Blood Groups (A, B, O System)," by Bertil Lundman

"The Species Concept," a discussion by Benjamin H. Burma and Ernst Mayr

"Adaptive changes induced by natural selection in wild populations of *Drosophila*," by Th. Dobzhansky.

"Membership in the Society for the Study of Evolution, which includes subscription to Evolution, is $5.00 per year. Separate subscriptions to the journal by institutions, libraries, or individuals, are $6.00 per year. Applications should be sent to the Treasurer, Mr. Karl P. Schmidt, Chicago Natural History Museum, Chicago 5, Illinois."

The biological history of mankind and the history of culture are inextricably interrelated; for the person who really wishes to know what happened, physical anthropology and archaeology must be combined.

Erik K. Reed
National Park Service
Santa Fe, New Mexico

NOTICE

Extra copies of RADIOCARBON DATING, *Memoir 8* of the Society, were printed. To encourage purchase by student groups or classes the Treasurer has made the extra run available for $1.00 per copy if ordered in quantities of 5 or more.

Orders should go, prepaid, directly to the Treasurer, George F. Will, Box 600, Bismarck, North Dakota.

The Viking Fund (now called the Wenner-Gren Foundation for Anthropological Research Inc.) has just released a publication, *The First Ten Years, 1941-1951*. This publication, which contains over 200 pages, is a remarkably complete report of the broad and diversified activities of the Fund. Included, among other things, is a cumulative record of all grants during the ten-year period. This volume will be mailed to those interested in anthropology and archaeology who request a copy. Requests should be sent to the Wenner-Gren Foundation, 14 East 71st Street, New York 21, N.Y.

ANNUAL MEETING
OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY, 1951

The sixteenth annual meeting of the Society for American Archaeology was held on Friday and Saturday, May 11 and 12, 1951 in the Technological Institute Building of Northwestern University at Evanston, Illinois. This meeting took place in conjunction with the twenty-seventh annual meeting of the Central States Branch of the American Anthropological Association. More than 100 persons attended these joint meetings.

MEETING OF THE EXECUTIVE COMMITTEE

As required by Article VI, Section 3 of the Constitution of the Society, the annual meeting of the Executive Committee was held prior to the annual business meeting of the Society. This meeting of the Executive Committee is included in the report of the Secretary.

ANNUAL BUSINESS MEETING

The annual business meeting of the Society was called to order by President Frank H. H. Roberts, Jr. at 11:30 a.m. on Saturday, May 12, 1951. About fifty members were present.

The minutes of the fifteenth annual meeting were approved as published in *American Antiquity*, Vol. XVI, No. 2, pp. 176-180 (October, 1950).

The report of the Elections Committee was read by the Chairman, George I. Quimby, and accepted. The results of the balloting by mail (382 ballots received) for new officers was as follows:

President: James B. Griffin

First Vice President: Junius Bird

Second Vice President: Madeline Kneberg

Treasurer: George F. Will

Members of the Executive Committee: W. C. McKern (to 1953), Waldo R. Wedel (to 1953).

The report of the Secretary was read and accepted (see p. 170 for this report).

The report of the Treasurer was read and accepted (see p. 171 for this report). At the completion of the reading of his report, the retiring Treasurer, Glenn A. Black, was given a rising vote of thanks in appreciation of his extraordinarily good work as treasurer of the Society for American Archaeology.

The report of the Auditing Committee was read and accepted (see p. 173 for this report).

The 1951-52 Budget as approved by the Executive Committee was presented for the information of the membership (see p. 171 for the budget).

The report of the Editor was read and accepted (see p. 173 for this report).

The report of the Viking Fund Award Committee was presented by Frank H. H. Roberts, Jr. who announced that the committee had selected Dr. Emil W. Haury to be the 1950 Viking Fund Medalist in Archaeology. The Viking Fund Award was presented to Dr. Haury at the Viking Fund Headquarters in New York City on February 10, 1951.

The report of the Committee for the Recovery of Archaeological Remains was presented by Frank H. H. Roberts, Jr.

An invitation from the Ohio State Archaeological and Historical Society for the Society for American Archaeology to hold its next annual meeting in Columbus, Ohio was referred to the Executive Committee.

It was moved, seconded, and approved by a unanimous voice vote that the Society for American Archaeology hold a special meeting for non-business purposes in conjunction with the annual meeting of the American Association for the Advancement of Science in Philadelphia, Pa. in December 1951.

It was moved, seconded, and approved by unanimous voice vote that Article I, Section 6 of the By-Laws be amended to read as follows:

> Any library, museum, university, school, or other institution may subscribe to the publications of the Society without privilege of membership. The annual cost of subscriptions shall be the same as the dues of the Active Members.

The following resolution proposed by Douglas S. Byers was adopted by unanimous voice vote:

> *Resolved*: That it is the consensus of this meeting that the Executive Committee and the Program Committee consider seriously the possibility of:
>
> 1. Extending the annual meetings of the Society for American Archaeology over a period of three days.
>
> 2. Arranging to have papers submitted sufficiently in advance of the meetings so that they may be mimeographed and distributed to members in order to replace simple presentation of subjects with informed discussion.

The following resolutions were presented by the Committee on Resolutions (David Baerreis, Chairman):

> *Resolved*: That the Society for American Archaeology assembled in its annual meeting at Northwestern University, Evanston, Illinois, hereby express its thanks and appreciation to Northwestern University, and to Dr. Richard Waterman for effectively taking care of the local arrangements.
>
> *Resolved*: That the Society for American Archaeology express its gratitude to Andrew Whiteford and Moreau Maxwell for arranging the program of the meeting.
>
> *Resolved*: That the Society for American Archaeology express its deep indebtedness to Glenn A. Black for his four years of efficient and faithful service as Treasurer of the Society.
>
> *Resolved*: That the Society for American Archaeology note with deep regret the death during the past year of the following members. E. V. Hedgecoke of Stinnett, Texas; James R. Hendry of Fort Worth, Texas; H. P. Mera of Santa Fe, New Mexico; and Floyd Schultz of Clay Center, Kansas; and that the Society hereby extend condolences to the families and associates of the deceased.

The annual business meeting adjourned at 1 p.m.

ANNUAL DINNER

The annual dinner of the Society for American Archaeology and the Central States Branch of the American Anthropological Association was held at Sargent Hall, Northwestern University at 7:00 p.m. on Friday, May 11. There were motion pictures illustrating archaeological work in Georgia and of British Colonial Policy in Africa.

OTHER SESSIONS

Friday, May 11—Morning Session, 9:00 a.m. to 11:30 a.m. Frank H. H. Roberts, Jr., Chairman.

1. The Origin of the Adena Culture. ALBERT C. SPAULDING, University of Michigan.
2. The Pool Village Site (Illinois Hopewell). JOHN C. MCGREGOR, University of Illinois.
3. A Preliminary Report on Excavations at Peters Cave. IRWIN PEITHMAN, Southern Illinois University.
4. The Hopewellian Culture in the Lower Wabash Valley. GEORG K. NEUMANN, Indiana University.
5. Archaeological Problems in the Upper Ohio Valley. WILLIAM J. MAYER-OAKES, Carnegie Museum, Pittsburgh.

Afternoon Session, 2:00 p.m. to 5:00 p.m. Glenn A. Black, Chairman.

1. The Effect of Restoration on Excavating Methods in a Highland Maya Site. RICHARD B. WOODBURY, University of Kentucky.
2. Ceremonial Cremation in the Harmon's Creek Culture. T. M. N. LEWIS, University of Tennessee.
3. The Tukabachee: Shawnee (?) Influences in Southeastern Culture. MADELINE KNEBERG, University of Tennessee.
4. New Archaeological Developments of the Natchez Trace. JOHN L. COTTER, National Park Service, Tupelo, Miss.
5. A Possible Site Near Port Arthur, Ontario. RICHARD S. MACNEISH, National Museum of Canada.
6. Ground Slates—Eskimo or Indian? WILLIAM A. RITCHIE, New York State Science Service.

Saturday, May 12—Morning Session, 9:00 a.m. to 11:00 a.m. W. C. McKern, Chairman.

1. The Over Focus, South Dakota. WESLEY R. HURT, JR., University of South Dakota.
2. Ceramic Stratigraphy at the Talking Crow Site, South Dakota. CARLYLE S. SMITH, University of Kansas.
3. A Report on West Texas Pithouse Excavation. WILLIAM J. SHACKELFORD, Southern Illinois University.
4. New Perspectives on the Antiquity of Man in America. ALEX KRIEGER, University of Texas.
5. The Carbon 14 Counter at the University of Michigan. JAMES B. GRIFFIN, University of Michigan.

Afternoon Session, 2:00 p.m. to 5:00 p.m. Paul Martin, Chairman.

1. The Protohistoric Period in Japan. RICHARD K. BEARDSLEY, University of Michigan.
2. Archaeological Research in the Rio Conchos Drainage, Chihuahua. J. CHARLES KELLEY, Southern Illinois University.
3. Caribbean Culture Contacts as Seen from Venezuela. IRVING ROUSE, Yale University.
4. Prehistory in Micronesia: Excavations in the Marianas. ALEXANDER SPOEHR, Chicago Natural History Museum.
5. A Preliminary Classification for Projectile Points of the Illinois Valley. EDWARD SCULLY, University of Michigan.

REPORT OF THE SECRETARY

During the past year, 1950-51, the following committee and other appointments were made by President Frank H. H. Roberts, Jr. and approved by the Executive Committee as required in the Constitution and By-Laws of the Society.

Nominating Committee: John Champe, Chairman; Robert Bell; and Henry Collins.

Elections Committee: George Quimby, Chairman; Carlyle Smith; and Roger Grange.

Viking Fund Award Committee: Frank H. H. Roberts, Jr., Chairman Ex Officio; L. S. Cressman; James B. Griffin; Jesse D. Jennings; William A. Ritchie; Robert Wauchope; Lauriston Ward; James A. Ford; John M. Goggin; Alex D. Krieger; and Erik K. Reed.

Program Committee: Andrew Whiteford and Moreau Maxwell, Co-chairmen.

Auditing Committee: Paul S. Martin, Chairman; Elaine Bluhm; Donald Collier; George Quimby; John Rinaldo; and Alexander Spoehr.

Committee on Resolutions: David Baerreis, Chairman; J. Charles Kelley; and John C. McGregor.

John M. Corbett was appointed representative of the Society for the annual meeting of the Council for Historic Sites and Buildings in Washington, D.C. on October 19 and 20, 1950.

Robert F. Heizer was appointed representative of the Society for the special meeting held in conjunction with the annual meeting of the American Anthropological Association at Berkeley, California in December, 1950.

In June 1950 the Executive Committee voted to accept an invitation from the Department of Anthropology of Northwestern University to hold the 1951 annual meeting of the Society on the campus at Evanston, Illinois as part of the centennial celebration of Northwestern University. Friday, May 11 and Saturday, May 12 were selected by the Executive Committee as the dates for the annual meeting.

In October 1950 the Executive Committee authorized the expenditure of $7.00 of the Society's funds by the Society's representative at the annual meeting of the Council for Historic Sites and Buildings.

In May 1951 the Executive Committee approved the report of the Elections Committee and declared the elections officially closed.

The Executive Committee appointed Dr. John Rinaldo to the Executive Committee to replace Dr. James B. Griffin.

The Executive Committee accepted the budget for 1951-52 as presented by the Treasurer.

The Executive Committee recommended that the incoming president take steps to establish a membership committee on a regional basis in order to increase the membership of the Society.

In accordance with the instructions from the Executive Committee, the Secretary investigated the use of the name "Society for American Archaeology" by an organization in Canada. The organization using the name was a student group that had not intended any inconvenience to the "Society for American Archaeology" and which

has now disbanded or has been incorporated into the University of Toronto Anthropology Club.

During the year those membership files in the Secretary's keeping were corrected from time to time as indicated by the Treasurer. A considerable number of inquiries about the Society matters and membership in the Society were handled. Notices of special or annual meetings and elections were sent to the membership. Also the annual election of officers by mail balloting was handled by the Secretary.

Respectfully submitted,

GEORGE I. QUIMBY
Secretary

REPORT OF THE TREASURER FOR THE FISCAL YEAR ENDING APRIL 30, 1951

ACCOUNT OF MEMBERSHIP

During the fiscal year May 1, 1950 through April 30, 1951, the total membership increased from 925 to 927. The changes were as follows:

	Active	*Institutional*	*Life*
May 1, 1950	708	206	11
Plus new and reinstated	67	17	0
	775	223	11
Less deceased, dropped and resigned members	76	6	0
Totals	699	217	11

Grant total—927 members.

We have on our books eight complimentary and exchange members, none of whom are included in the above totals.

DECEASED IN 1950-51

E. V. HEDGECOKE
FLOYD SCHULTZ
J. R. HENDRY
H. P. MERA

BUDGET FOR 1951-52

ESTIMATE OF INCOME

Estimated beginning balance brought forward, broken down as follows:		
Balance forward, WORKING FUND	$ 106.25	
Balance forward, PLANNING COMMITTEE	972.19	$ 1,078.44
Prepaid dues on hand:		
23 fully prepaid members at $6.00	$ 138.00	
14 fully prepaid institutions at 6.00	84.00	
91 partly prepaid institutions at 3.00	273.00	
1 partly prepaid member at 5.00	5.00	
1 partly prepaid member at 3.49	3.49	503.49
Total estimated beginning balance brought forward		$ 1,518.93
Estimated income from dues paying members and institutions:		
From the above 91 partly prepaid institutions at $3.00	$ 273.00	
From 1 member partly prepaid	1.00	
From 1 member partly prepaid	2.51	
From 674 members at $6.00	4,044.00	4,992.51
Sale of AMERICAN ANTIQUITY		500.00
Transfer from Publication Fund to defray expense of publishing Memoir No. 8 as follows:		
Viking Fund, Inc., contribution	$ 300.00	
Soc. for Amer. Arch. commitment	600.00	900.00
Estimated payments by authors for excess illustrations and tables		800.00
Collection of current accounts receivable		223.74
Total estimated income		$8998.18

BUDGET FOR 1951-52

ESTIMATED EXPENSE

Publishing AMERICAN ANTIQUITY, Vol. XVI, No. 4	$ 1,150.00	
Publishing AMERICAN ANTIQUITY, Vol. XVII, Nos. 1-4	4,600.00	
Publishing Memoir No. 8	900.00	
		$ 6,650.00
Planning Committee Expense		972.19
Editor's Account:		
Editorial Assistance ($150.00 per quarter)	$ 600.00	
Editorial Secretary ($50.00 per quarter)	200.00	
Art Work ($12.50 per quarter)	50.00	
Postage, telegrams, expense on proofs, etc.	50.00	
		900.00
Treasurer's Account:		
Secretarial Assistance (per year)	$ 180.00	
Postage and miscellaneous supplies	75.00	
Printing, stationery, invoices, etc.	25.00	
Bank and collection charges	15.00	
		295.00
Miscellaneous Expense:		
President's Office	25.00	
Secretary's Office (ballots, announcements, etc.)	80.00	
		105.00
Transfer of surplus income to Publication Fund		75.99
Total estimated expense		$8998.18

WORKING FUND

Receipts

Beginning balance brought forward, 5/1/50		$2,197.64
Income from dues and subscriptions:		
Prior years	$ 38.00	
1950-51 (current)	5,054.10	
Prepaid (1951-52)	503.49	
		$5,595.59

Contributions and grants as follows:

Kenneth Pfirman	$ 4.00	
Leslie R. Johnson	10.00	
A. V. Kidder Memorial Fund	301.47	
Viking Fund, Inc. (for Memoir No. 8)	300.00	
		615.47
Sale of AMERICAN ANTIQUITY and Memoirs		629.10
Reimbursement to the Society by authors for reprint orders		609.55
Reimbursement to the Society by authors for extra illustrations		830.46
Receipts of a sundry nature:		
Exchange charge on Canadian check	.60	
Excess charges for changes in proof	9.36	
Overpayment of dues	3.50	
Sale of strip list	5.17	
From author for deficit incurred in publication of Memoirs 6-7	164.10	
Transfer from publication fund for payment of Memoirs 6-7	1,200.00	
Budgeted transfer from Permanent Fund to satisfy debt incurred for moving Editor's office	250.00	
Sale of strip list	5.00	
Receipt of postage in advance	.05	
Received, over/short, from Newburgh State Bank	2.25	
		1,640.03
Total Receipts		9,920.20
Total, balance forward and receipts		$12,117.84

WORKING FUND

Expenditures

Publishing AMERICAN ANTIQUITY:		
For printing	$ 6,568.38	
For illustrations	903.43	
For distribution	205.11	
		$ 7,676.92
For reprints of articles published in AMERICAN ANTIQUITY		689.24
Editorial expense		810.46
Treasurer's expense		258.55
Expenses of a sundry nature:		
Miscellaneous printing, (ballots, announcements, mailing wrappers, strip lists, etc)	111.91	
Exchange charge on collection of Canadian check	.66	
Re-entry of AMERICAN ANTIQUITY as 2nd class postal matter	10.00	
Transfer of inventory of AMERICAN ANTIQUITY back issues from Menasha, Wisc. to Salt Lake City, Utah	366.20	
Representation at meeting of Nat'l Council of Hist. Sites and Bldgs.	7.00	
Refund for overpayment of dues	3.50	
Transfer to Publication Fund of A. V. Kidder Mem. Fund contribution	301.47	
Transfer to Publication Fund of Viking Fund contribution	300.00	
		1,100.74
Total Expenditures		$10,535.91

Balance

Total, balance forward and receipts	$12,117.84
Less total expenditures	10,535.91
Balance, cash on hand, 4/30/51	$ 1,581.93
Balance, cash on hand, 4/30/51, broken down as follows:	
General operating balance	609.74
Planning Committee fund	972.19
	$ 1,581.93

BALANCE SHEET

Resources

Cash on hand in checking account, general operating balance	$ 609.74		
Cash on hand in checking account, reserved for Planning Committee	972.19		
		$ 1,581.93	
Publication Fund, Savings Acct.		2,435.75	
Permanent Fund, Savings Acct., (deposits for Life Memberships).		627.65	
Accounts receivable:			
Due from sale of AMERICAN ANTIQUITY	150.25		
Due from authors for extra illust.	31.49		
Due from authors for reprint orders	43.75		
		225.49	
Total Resources			$ 4,870.82

LIABILITIES AND CAPITAL

Membership dues and subscriptions, prepaid	$ 503.49		
Estimated Accounts Payable:			
Publishing AMERICAN ANTIQUITY, Vol. XVI, No. 4	1,150.00		
Editorial expense incurred in publishing Vol. XVI, No. 4	150.00		
Secretarial assistance for Treasurer	30.00		
		1,833.49	
Restricted capital:			
Viking Fund, Inc. contribution for Memoir No. 8	300.00		
Cash on hand in Checking Account reserved for Planning Committee	972.19		
Permanent Fund Savings Account, (deposits for Life Memberships)	627.65		
		1,899.84	
Free Capital		1,137.49	
Total Liabilities and Capital			4,870.82

PERMANENT FUND

Balance brought forward, 4/30/50		$ 868.95	
Receipts:			
Interest computed, June 30, 1950	$ 4.34		
Interest computed, Dec. 31, 1950	4.36		
		8.70	
			$ 877.65
Less transfer to Working Fund, authorized in 1950-51 budget			250.00
Balance on hand, 4/30/51			$ 627.65

PUBLICATION FUND

Balance brought forward, 4/30/50		$ 3,006.66
Receipts:		
Interest computed, June 30, 1950	$ 12.53	
Interest computed, Dec. 31, 1950	15.09	
Contribution, A. V. Kidder Memorial Fund	301.47	
Contribution, Viking Fund, Inc., for Memoir No. 8	300.00	
		629.09
		$ 3,635.75
Less transfer to Working Fund for payment of Memoirs 6-7		1,200.00
Balance on hand, 4/30/51		$ 2,435.75

REPORT OF THE AUDITING COMMITTEE

We, the undersigned, appointed as the Auditing Committee, report that we have examined the Treasurer's accounts as submitted for the fiscal year May 1, 1950 through April 30, 1951, and find them correct and in order.

PAUL S. MARTIN
ALEXANDER SPOEHR
ELAINE BLUHM
DONALD COLLIER
JOHN B. RINALDO
GEORGE I. QUIMBY

REPORT OF THE EDITOR

The Society published Volume XVI of *American Antiquity* amounting to 392 pages. No memoir was released. This falls short of the total pages (including Memoir 6-7) published during 1949-50. In its present format, each page of *Antiquity* carries a few less words than previously. An issue of 100 pages approximately equals in word content a ninety-six page issue of the earlier format.

During the past year, the editor has received directly, or inherited from the previous editor, 67 contributions. Of these, 8 were rejected, while 15 were returned to the author for major or minor modification. Some, but not all, of the 15 returned to the author for modification have been resubmitted and subsequently accepted. As of May 1, there is on hand material for one issue beyond the issue now in press.

As a novice editor, I have had several problems to face. The first and ever present one was the sustaining of the high level of editorial skill achieved by my predecessor. This problem, of course, remains permanently with me. The second problem was the location of a publisher. As all of you know by now, the University of Utah Press agreed to publish the magazine and any memoirs which may be developed. Despite the change in publishers, it was possible to retain all the features of the accustomed format except for the basic type face. The present type is one of the Goudy family, and it is a little more open; it has provided greater readability at a slight loss in words-per-page as mentioned earlier.

The only departures from tradition in the departments of the quarterly are the addition of *Book Notices*, wherein we are attempting to report important publications which do not specifically, because of subject matter, merit a full review, and the addition of the *General* section with which we open *Notes and News*. Both of these worth-while innovations are the work of the Associate Editor, Erik Reed.

No modification of the basic style to which the membership is accustomed and of which it apparently approves is contemplated. Through the fine cooperation of the Assistant Editors working with the Associate Editor, we have been able to provide well balanced issues with a consistent Notes and News section. This same group also provided the material for the "Recent Publications" feature.

We have published 25 articles of wide range, 28 Facts and Comments offerings, and 29 Book Reviews; four rather full Notes and News sections and numerous miscellaneous items were offered. The editorial staff is working toward continuing the balanced space allocation achieved in the last two or three issues.

In the face of possible increase in costs and our hope to retain more or less the present utilization of space, I have been requesting authors to consider twenty pages, double-spaced, as normal maximum manuscript length for major articles. Occasional articles of greater length will, because of their significance, be perforce accepted.

In concluding this brief statement, I want to mention with sincere appreciation the patience, clarity, and skill with which Irving Rouse passed on to me the editor's baton; for his kindness I shall remain forever in his debt. Equal patience and helpfulness have been shown over a longer period by the departing Treasurer, Glenn A. Black. To both of them, I should like again to proffer my deepest thanks.

NOTES AND NEWS

GENERAL

At the present writing (early August), the fate of the urgent River Basin archaeological salvage program outside the Missouri River drainage is uncertain. The entire activity was cut out by the House in considering Interior Department appropriations for the fiscal year, which began on July 1; the Senate is reportedly willing to permit the National Park Service to distribute part of the reduction in total funds among other activities in order to resume a minimum program (if congressional action is completed by late August).

In a separate section on EARLY MAN several significant developments are reported; scattered references occur in other departments: COLONIAL archaeology at Saugus, Mass., is reported in the summer 1951 issue (Vol. 2, No. 4) of *American Heritage*, the profusely illustrated quarterly of the American Association for State and Local History, edited by Earle Newton at Sturbridge, Mass. (published at 73 Main St., Brattleboro, Vermont).

The sixth Summer Seminar in Physical Anthropology met June 25-30 at the Wenner-Gren Foundation (formerly the Viking Fund, Inc), New York, and considered the various subjects composing the field of physical anthropology from the point of view of graduate education, discussing means of improving research techniques, teaching methods, and general understanding of physical anthropology. Comprehension of totalities—human ecology, the nature of evolution, study of populations, entire life-spans of individuals—was emphasized as against factual minutiae.

The first number of the quarterly *Clearinghouse Bulletin* of the "Clearinghouse for Research in Human Organization," established by the Society for Applied Anthropology, was published by that society late in the spring of 1951. Quite interesting psychological-sociological materials will appear here, but evidently very little which is historical in nature and of direct interest as such to archaeologists. The central office of the clearinghouse has been located in Chicago; inquiries and research materials should be addressed to Charles F. Harding, III, Director, Clearinghouse for Research in Human Organization, 79 W. Monroe St., Chicago 3, Illinois. The general offices of the Society for Applied Anthropology and the editorial office for the quarterly journal, *Human Organization* (of which Vol. 10, No. 1, was issued Spring 1951, including papers on southeast Asia and the Philippines, and on methodology; none on American Indian topics), remain at 61 West 55th St., New York 19, N.Y.

ADDITIONAL RADIOCARBON DATES

Radiocarbon laboratories have been organized at Yale, Columbia, and the Universities of Michigan and California (Berkeley), in addition to that at Chicago.

Of greatest interest is the following report on the radiocarbon laboratory of the University of Michigan, furnished by Dr. James B. Griffin of the Museum of Anthropology, University Museums, Ann Arbor, Michigan:

"In the summer of 1949, the University of Michigan approved the construction of equipment and provided space for a radiocarbon laboratory following the development of this technique of age determination by W. F. Libby and J. R. Arnold of the University of Chicago Institute for Nuclear Studies. The Michigan Memorial-Phoenix Project has supplied the funds. Professor H. P. Crane, of the Department of Physics, assisted by Mr. Earl McDaniel, designed and constructed the counter and electronic equipment and is responsible for its operation. The chemical laboratory for the extraction and purification of the carbon from submitted specimens was set up by Mrs. Gloria Thornton. She is responsible for the preparation of all material to be measured. A Carbon 14 Curatorial Committee of James B. Griffin, Volney H. Jones, Claude W. Hibbard, and H. H. Bartlett assumed the responsibility for receiving, cataloguing, and evaluating materials submitted for dating.

"Dr. Crane has designed the counter so that it is completely automatic. After a sample is introduced, the counter takes one-hour measurements, in rotation, on the unknown sample and the two camparison samples, one of the latter being contemporary and the other completely inactive. Separate count registers and clocks total up the counts and time on each of the three samples over a 48-hour run, which consists of 16 one-hour measurements on each of the samples. The counter high voltage, which normally has to be watched carefully, adjusts itself automatically according to the pulse size, and so requires no attention. Improvements in the chemical method of preparation of the samples have also been made by Dr. Crane, which now allows carbon to be prepared which has only a fraction of a percent ash content. In the procedure used heretofore, the ash has run from five to ten percent of the weight of the sample, making possible an appreciable error in the age figure.

"Some seventy lots of material have been received by the Curatorial Committee and include close to 150 different specimens. Seventeen states and nine foreign countries provide a wide geographical range. The specimens vary from late Pleistocene fauna to late prehistoric archaeological carbon in the eastern United States. Most of the samples are wood or charcoal, but mastodon tusk, shell, and marl have been successfully tested. A number of samples of known age, some supplied by W. F. Libby and his group, have been measured as checks, and have produced agreement with the known ages within the expected statistical limits of error. Processed carbon from a hearth at the Lamoka site, Schuyler County, New York, Libby and Arnold No. 288, for which they obtained a date of 4369 years ago, ran 4300 years ago in the Michigan laboratory. Processed carbon from a tree killed by the eruption of Mt. Mazama in Oregon, Libby and Arnold No. 247, for which they obtained a date of 6453 years ago, is given an age of 6000 years ago by Crane and his associates."

The theoretical basis and the laboratory techniques of the Carbon 14 method have been presented in a number of papers; and actual dates obtained as of 1950 were published by J. R. Arnold and W. F. Libby early this year: "Radiocarbon dates," *Science* 113 (No. 2927): 111-120, February 2, 1951. In the symposium constituting Memoir No. 8 of the Society for American Archaeology, *Radiocarbon Dating*, assembled by Frederick Johnson, published in July 1951 as Part 2 of *American Antiquity*, Vol. XVII, No. 1, all New World dates obtained through June 21, 1951, are listed and interpreted with discussion of their effects on concepts of the antiquity of man in America and development of native American cultures.

No additional findings of new dates not reported in the July symposium (Memoir No. 8) have been released yet, so far as is known. In future issues of *American Antiquity*, we plan to list in this space all new Carbon 14 dates definitively reported, even though they may also be given, with or without discussion, under the appropriate geographical-area heading.

Additional references on the Carbon 14 method in general include: David M. Gates, "Dating of archaeological material by means of radioactive carbon 14," *Southwestern Lore* XVI: 1-4 (No. 1 June), Boulder, Colo., 1950; Sigvald Linné, "Dating specimens by means of the Carbon (C^{14}) method," *Ethnos* 15: 206-213 (1950:3, 4), *Statens Etnografiska Museet*, Stockholm, 1950 (in English); these are no doubt based on the original two communications outlining the method (W. F. Libby, E. C. Anderson, and J. R. Arnold, "Age determination by radiocarbon content: world-wide assay of natural radiocarbon," *Science* 109:277-228, 1949; J. R. Arnold and W. F. Libby, "Age determinations by radiocarbon content: checks with samples of known age," *Science* 110: 678-680, 1949). Several problems and possible pitfalls of the method are pointed out by H. H. Bartlett, "Radiocarbon datability of peat, marl, caliche, and archaeological materials," *Science*, 114 (No. 2951), July 20, 1951, pp. 55-56. In this connection an important paper by L. S. Cressman on "Western Prehistory in the Light of Carbon 14 Dating" has just appeared in Autumn 1951 issue (Vol. 7, No. 3) of the *Southwestern Journal of Anthropology*.

NEW MATERIALS ON DENDROCHRONOLOGY

An up-to-date mimeographed leaflet by T. L. Smiley on "Archaeological field practices regarding tree-ring specimens" has recently (early in 1951) been issued by the Laboratory of Tree-Ring Research, University of Arizona, Tucson. All major collections of Southwestern tree-ring material, both actual specimens and plots, have been or are being collected at the Tucson laboratory as a central repository, and are being reviewed and checked by Mr. Smiley. Tree-ring materials from the Museum of Northern Arizona (Flagstaff), the Laboratory of Anthropology (Santa Fe), and the University of New Mexico (Albuquerque) have been added to the already extensive collection of the University of Arizona. Mr. Smiley is going to publish a revised complete check-list of all dependable tree-ring dates which so far have been determined from Southwestern archaeological remains, with discussion of their interpretation. Dates obtained by E. T. Hall, Jr., before the war, including a number not previously published, are given in *Tree Ring Bulletin* Vol. 17, No. 3, Tucson, April 1951.

Of interest to dendrochronologists, and possibly not widely seen in this country, is a paper recently published in Britain on photoelectric comparison of bar graphs of tree-ring series and mathematical handling of coefficients of correlation: Gordon D. Gibson, "A rapid method for ascertaining serial lag correlation," *Biometrika* 37: 288-307 (Parts 3-4, December), 1950. Dr. Gibson points out that ring series more than 100 years long are required for confidence in cross identification by statistical methods when the correlation is relatively low.

EARLY MAN

Early in 1951 the Assistant Editor for Early Man began a correspondence with Hugo Gross of Bamberg, Germany, a paleontologist with long experience in the Pleistocene of northern Europe. Gross is interested in comparing the archaeological and geological evidence bearing on the time of extinction of various Pleistocene mammals in Europe, western Asia, and America—a rich problem now greatly aided by accumulated data and radiocarbon datings. This correspondence resulted in the preparation of a manuscript by Gross on "Mastodon, Mammoth, and Man in America" to be published in the 1951 Bulletin of the Texas Archaeological and Paleontological Society. Among other interesting observations, a theory is advanced to account for occasional discoveries of more or less complete proboscidean skeletons and nearby artifacts which can hardly be reconciled with them—as, for example, the Alangasi mastodon found by Spillman in Ecuador along with numerous potsherds. Students of early man in America will be interested in learning that Dr. Gross has succeeded in recovering ("from the ruins of Berlin") eight of the artifacts found in Missouri by Albert C. Koch in 1838-1840, reportedly in association with mastodons. These are illustrated in the same article and turn out to be typical of Archaic in the eastern states, rather than known earlier types.

The question of contemporaneity of human remains and Pleistocene fauna at Vero and Melbourne, Florida, debated for many years, has recently been investigated in great detail by Irving Rouse in "A Survey of Indian River Archeology, Florida" (Yale University Publications in Anthropology, No. 44, 1951). Although the general conclusions are that the human remains were not contemporary with mammoth, mastodon, and other extinct mammals at these sites, Rouse's study is a model of painstaking and cautious approach to a complicated situation of this kind. It also presents valuable data on fluctuations in water table and sea level, climate, ecology, physiography, relative time of the extinctions, and a tentative chronology.

Highly significant information on the shrinking of ancient Lake Lahontan in a series of stages with some minor readvances has been gained in recent months by Roger Morrison of the USGS in the vicinity of Fallon, Nevada. In June and July two graduate students of the Department of Anthropology, University of California, made excavations in Hidden Cave, close to a series of Lake Lahontan shorelines mapped by Morrison. Under the archaeological deposits are lake gravels which can probably be correlated with a definite stage in the shrinking lake, adding important data to the climatic history of the Great Basin. Robert F. Heizer has received a radiocarbon dating of 11,199 ± 570 years on bat guano mingled with Lahontan lake gravel in the bottom of Leonard rockshelter near Lovelock, Nevada; the date indicates the time that the lake had fallen enough to free the cave and bats could live in it. At Danger Cave near Wendover in western Utah, Jesse D. Jennings has obtained 2 radiocarbon datings of 11,450 ± 600 years on mountain sheep dung just above gravel deposited by shrinking Lake Stansbury, and 11,150 ± 570 on wood. Thus, there is perfect agreement in the time of lowering of both these great lakes enough to free the caves for occupation by mammals. In Leonard rock shelter the date, previously issued by Libby and Arnold, of about 8,700 years on an artifact-bearing level indicates a lapse of roughly 2,500 years between the freeing of the cave and human occupation, but this does not preclude man's presence in the area during the interval. In Danger Cave the age of the first artifacts is the same as that of the dated materials. The deposit is quite deep and a long human occupation is to be expected here too.

The radiocarbon date released by Libby and Arnold, of 11,003 ± 500 years for the Armenta Horizon (Becerra fauna) near Mexico City likewise provides a reference point for the shrinking of ancient lake Texcoco after its maximum stage in the late Pleistocene. Other datings announced for the Cochrane and/or Mankato glaciation in the Middle West generally fall between 11,000 and 12,000 years ago. Thus a remarkable picture of consistency is emerging in the dating of retreating glaciers and shrinking lakes following the last major Wisconsin advance in widely separated parts of North America; and these agree closely with similar phenomena in northern Europe. The Assistant Editor for Early Man further remarks that this consistency is working in the other direction as well: it contributes to the validity of the radiocarbon dating method itself.

In June and July, the Texas Memorial Museum, under the field direction of Glen L. Evans, geologist, and Grayson E. Meade, paleontologist, conducted excavations in the stratified deposits in the city reservoir basin of Lubbock, Texas. The diatomaceous pond deposit which had previously revealed remains of extinct bison, partly charred in some cases, was explored and four projectile points of the classic Folsom type were found in place. Thus, the radiocarbon date of 9,883 ± 350 years for burned bison bone from this deposit (see Memoir 8), which was postulated as a date for Folsom artifacts because the latter occurred in an identical stratum at Clovis, is now double-checked as a valid Folsom date.

The Friesenhahn cavern 20 miles north of San Antonio, Texas, which in 1949 had been partly explored by the Texas Memorial Museum and had yielded large numbers of Pleistocene animals and some evidence of man, was again opened by the Museum in August. More fossil material was collected, and deep down in the erosion channel some charcoal recovered. The channel postdates the bulk of the cave deposit but was cut and refilled long ago before the cavern became completely sealed off for both man and animals. The charcoal should therefore provide a clue to the minimum age of the fossils and possible artifacts.

ARCTIC

Two very timely salvage operations are progressing in Alaska this season. One of these concerns the excavation of parts of several sites at Point Barrow, where naval construction is annually covering more of the rather restricted area where Eskimos have lived for many centuries. The Arctic Research Laboratory of the Office of Naval Research made it possible for Owen Rye, of the University of Alaska, to do some of this work in 1949, and is now opening its facilities to Harvard University archaeologists. Those concerned are Bertram Carter, Thomas Cain, Charles Shade, and Robert Tanner.

James W. Van Stone, excavating the Old Kotzebue site with Eskimo help, reports that he manages to keep barely ahead of the bulldozers that are clearing an extension of a local airstrip at Kotzebue.

Dorset and eastern Thule sites are the subject of at least two investigations. William E. Taylor of the University of Toronto, who worked with Henry B. Collins last season, returned this year to Resolute Bay, Cornwallis Island, to continue the project undertaken by Collins for the past three years for the National Museum of Canada and the Smithsonian Institution.

Deric O'Bryan left in June for Mill Island in Hudson Strait, where, under an Arctic Institute of North America grant, he will excavate Dorset sites which he located in 1929 when a member of the McMillan Expedition.

NORTHWEST COAST-PLATEAU

Wilson Duff, Provincial Museum, Victoria, B.C., has just completed a short ethnographic survey of the Tweedsmuir Park area of British Columbia. The area was apparently very thinly populated—even relative to other Carrier areas—but was used for hunting and trapping. Two well-used trails between coast and interior passed through this area.

Charles E. Borden, University of British Columbia, made a test excavation at Musqueam near the mouth of the Fraser River. Cultural material extended below the trench depth of 11 feet. The deposit below the present water table, encountered at a depth of 6 feet, is completely water-logged, and excellently preserved perishable material was recovered from this. Future work is

planned here when a larger crew and adequate pumping facilities are available.

Carroll A. Burroughs, University of Washington, and a crew of students partially excavated a shell midden at Garrison Bay on San Juan Island, Washington. Items of European manufacture, probably relating to the period of English occupation (1859-1872), were found in the root mat on top of the deposit, but no evidence of European influence appeared in the midden material. This and other archaeological data suggest that the site was abandoned before the settlement of the islands by Europeans. Two burials from the lower strata show frontal deformation of the skull.

Douglas Osborne directed University of Washington excavations of pit-house and burial sites in the Upper McNary Reservoir of the Columbia River near Pasco, Washington, under a contract with the National Park Service. In the University's archaeological laboratory Osborne has completed a study of all skeletal material thus far recovered from the Plateau area, and has partially completed studies on the 1950 McNary excavations.

Richard Daugherty, State College of Washington, excavated a possible early man site in the Lind Coulee area of Eastern Washington with funds from State College and University of Washington.

Luther S. Cressman, University of Oregon, and a party of eight students excavated on the Klamath Indian Reservation, continuing the study of Klamath prehistory and its place in the culture of the northern Great Basin. This summer's dig concluded the four seasons' work on Klamath prehistory. Sufficient information has now been collected so that at least the outlines of the subject can be adumbrated. It is hoped that the manuscript setting forth the results of this work will be completed during the coming year. The archaeological survey of the Oregon coast is being conducted by Lloyd R. Collins under the direction of L. S. Cressman.

At the Fourth Annual Meeting of the Northwest Anthropological Conference at Reed College on May 4 and 5, papers of archaeological interest included "Aleut prehistory" by James W. Leach, University of Oregon, "The cultural position of the Kalapuya in the Pacific Northwest" by Lloyd R. Collins, University of Oregon, and a symposium reviewing fields of anthropology in the Northwest—archaeology (C. W. Borden), physical anthropology (William S. Laughlin), linguistics (Melville Jacobs), cultural anthropology (Viola Garfield); at the dinner session, Fay-Cooper Cole spoke on trends in anthropology.

CALIFORNIA-GREAT BASIN

Robert F. Heizer, University of California, with a crew of ten students, investigated two California areas. At Willow Creek, Monterey County, two midden layers separated by 10 feet of water laid gravels were excavated. Cultural differences between the two deposits, and a radiocarbon date of about 1900 years for the lower deposit permit some estimate of the course and time required for local cultural development. The upper midden contained large numbers of jade (nephrite) pebbles used as cooking stones and hammerstones. Work in the upper Napa Valley near St. Helena was concentrated on a deep refuse mound producing cremations in the upper levels and flexed burials in the lower levels.

A. E. Treganza conducted salvage archaeology in the Farmington Reservoir area, Stanislaus County, under a contract agreement between the University of California and the National Park Service. A number of sites were excavated, all of them producing heavy-duty core and flaked tools reminiscent of the Topanga culture types. Artifacts extruding from the stream banks and the nature of the occupation sites point to the Farmington complex as fairly ancient.

Francis Riddell conducted dry cave excavations in the Lassen County area.

Clement Meighan of the University of California Archaeological Survey excavated dry caves in the Panamint Mountains under terms of another National Park Service-University of California contract. Meighan has been reappointed Archaeologist, and Martin Baumhoff Assistant Archaeologist of the U.C.A.S. As of June 1951, at the end of its third year, the U.C.A.S. had recorded a total of 5,211 sites in California.

Jack Rudy, Field Director of the University of Utah statewide archaeological survey, assisted by Robert Zeigen, made a rapid reconnaissance survey of the west-central portion of the state of Utah. They made a rapid sampling of sites reported by a group of informants from the upper Uintah Basin near Vernal, Utah.

SOUTHWEST

Two related excavation projects in the western slope of Colorado were under way this past summer, in the vicinity of Grand Junction. The University of Colorado conducted its fourth annual Field Session in Archaeological Research in the area south of Grand Junction, Colorado, directed by Robert H. Lister, of the Department of Social Sciences, and Herbert W. Dick, of the University Museum. Excavations were made in two cave sites, and in several open sites. One of the caves contained pottery in addition to artifacts of stone, bone, and perishable materials; the other was entirely preceramic. Several of the open sites were quite deeply buried, exposed in the banks of arroyos.

In July a party from the Denver Museum of Natural History, under the direction of H. Marie Wormington, began excavation of a rock shelter on East Creek, a mile distant from the University of Colorado job. In the shelter, occupation debris was encountered to a depth of thirteen feet. This site appears to contain the same non-horticultural nonceramic complex that was found in two shelters in Montrose County, Colorado, excavated by the Museum in 1938 and 1939. It is characterized by a wide range of projectile point types greatly varied in size, very large blades, and a distinctive implement more or less rectangular in shape with one edge flaked on one side only and one or more edges flaked on both faces.

In southwestern Colorado, the boys of Explorers Camp, Inc., led by Kenneth Ross, dug further in the extensive Cahone Ruin (described in A. K. Guthe, "A preliminary report on excavations in southwestern Colorado," *American Antiquity* Vol. XV, No. 2, October 1949). In Mesa Verde National Park, Al Lancaster and Francis Cassidy studied New Fire Temple, a cliff ruin which appears to be a modified Great Kiva.

The major current project of the National Park Service in the Southwest is that of comprehensive repair and stabilization, requiring considerable excavation, of Yellow House (Kin Kletso) in Chaco Canyon National Monument, northwestern New Mexico, by R. Gordon Vivian, of the Southwestern Monuments organization. In the completion of clearing of this fair-sized pueblo, only a small amount of artifactual material has been found so far—not even very many potsherds; but, interestingly, practically all of Mancos-McElmo (Mesa Verde) rather than Chaco type. An extremely striking painted kiva, with red and yellow horizontal stripes, is being cleared and will be sheltered for exhibit.

Advance salvage excavations at Te-ewi (La 252) on the lower Chama River were carried on by the Museum of New Mexico, under research contract with the National Park Service, during June and July under the direction of Stanley Stubbs. Three kivas were partly excavated, one of them a large one resembling the big kiva in Frijoles Canyon; a cross section including a dozen ordinary rooms has been dug; and several rock-circle shrines adjoining the pueblo have been tested. Only three burials and a small quantity of artifacts, have been found in this second season. Among items of special interest are a crude stone idol, found in an ordinary room, and a good foot-drum in a kiva floor, also other unusual features of kivas.

The field school of the University of New Mexico, directed by Paul Reiter, worked in a cave near Capitan, N. Mex. The field school from Texas Tech., Lubbock, directed by Jane Holden, carried on the second season of excavations in the Bonnell Ranch site, between Hondo and Ruidoso, N. Mex.

With an augmented crew, R. J. Ruppé and A. E. Dittert continued their work on Cebolleta Mesa, east of Acoma, N. Mex. J. O. Brew and Watson Smith, with the main Peabody Museum expedition, were south of Quemado, N. Mex.; and Robert McGimsey with a small crew was at the prior location north of that city. Paul Martin and John Rinaldo of the Chicago Museum of Natural History returned to Pine Lawn in southwestern New Mexico, and are working until mid-September at sites in the Reserve area.

The major project in Arizona was again that of the University of Arizona field school, directed by Emil W. Haury, at Point of Pines on the San Carlos Apache Reservation, working on sites ranging from a second big ceremonial structure in the Circle Prairie early Mogollon pithouse village (cf. Joe Ben Wheat, "The 1950 season at Arizona W:10:15," *The Kiva* 16:16-20, No. 3, December 1950, Tucson, 1951), to late (14th or 15th century) pueblo remains. In northeastern Arizona, David deHarport resumed his survey of sites and pictographs in Canyon de Chelly, and Walter Taylor and William Y. Adams carried on a detailed investigation of Pueblo III refuse mounds in the Navajo Mountain area, in an effort to correlate population and ecological factors.

John C. McGregor is the author of a new book published in July, *The Cohonina Culture of Northwestern Arizona* (University of Illinois Press), which describes the results of a joint expedition of the University of Illinois and the Museum of Northern Arizona in the area between Williams and Grand Canyon, Arizona, in 1949.

Interesting finds were made by Charles DiPeso at Quiburi this past spring, including a variety of Spanish metal objects and a pair of eighteenth-century spectacles made in Nuremberg (presumably brought to Sonora by a German Jesuit priest).

The 1951 Pecos Conference met at Point of Pines, Arizona, August 15-17, with Emil Haury, Stanley Stubbs, and Arnold Withers as the plans and arrangements committee. Jesse Jennings served as general moderator. In addition to the usual roundup of field reports, there were special discussions of fieldwork in ethnography and applied anthropology, with Evon Z. Vogt presiding; of "The Enemy Peoples," led by Albert H. Schroeder; of differences between northern and southern archaeological Pueblo groups, Erik Reed in the chair; and of the meaning of Carbon 14 dates, presented by Jesse Jennings and Ernst Antevs. The next meeting is to be at Santa Fe, at the invitation of the Museum of New Mexico, in July or August 1952.

NORTHERN PLAINS

The archaeological activities of the River Basin Surveys, Smithsonian Institution, in the basin of the Missouri River during the summer of 1951 were carried on by eight major parties, seven engaged in excavation of selected sites, one in survey of proposed reservoirs to locate sites which must be excavated. Franklin Fenenga carried out surveys in a considerable number of reservoir areas in Montana, Wyoming, Kansas, Nebraska, and South Dakota. Eight institutions other than the Smithsonian conducted field work under cooperative agreements with the National Park Service in reservoirs scattered through Nebraska, Wyoming, and the Dakotas.

In the Keyhole Reservoir on the Belle Fourche River, eastern Wyoming, Richard P. Wheeler headed a Smithsonian Institution party investigating both lithic and ceramic sites; and William Mulloy led a field party from the University of Wyoming. One site (48CK7), among three investigated by the University in the Keyhole Reservoir, has yielded artifacts similar to, though not identical with, Signal Butte II.

In the Garrison Reservoir, North Dakota, where construction of the dam is well along, two Smithsonian parties are operating. One of these, headed by G. Hubert Smith, is excavating historic sites. During June and July, excavations were made at Fort Stevenson, a typical Missouri River frontier military post of 1867-1883. The other, supervised by Donald D. Hartle, is conducting excavations at Indian sites in the reservoir area. Additional investigations were undertaken in June and July in the Rock village, an important fortified earth-lodge village. In addition, Carling Malouf led a field party from Montana State University to the Garrison Reservoir, North Dakota, where he investigated small sites. Site 32ME43 was found to be occupied by a culture usually associated with the remains of earth lodges, but no such structures were present. Pottery and chipped-stone artifacts were fairly abundant. A few European trade items were found. The site may represent a hunting camp used seasonally by the Mandan, Hidatsa, or Arikara.

The State Historical Society of North Dakota returned to Like-a-Fishhook village, otherwise known as the old Fort Berthold site, with James Howard in charge. This represents the last earth-lodge village on the upper Missouri River and was occupied by the Mandan, Hidatsa, and Arikara from 1867 to 1890. Several round earth-lodges, a probable log cabin, parts of the palisade, and several cache pits have been excavated. Very few specimens of aboriginal manufacture were found.

In the Oahe Reservoir area, South Dakota, Waldo R. Wedel, of the U.S. National Museum, excavated parts of a two-component site near the mouth of the Cheyenne River. The later component is probably the Arikara village which Trudeau, in 1794, found recently abandoned. The other occupation is characterized by rectangular houses and a quite different pottery complex. Donald J. Lehmer, of the River Basin Surveys, again excavated sites in the vicinity of the Oahe Dam.

A Smithsonian party headed by Robert B. Cumming, Jr., worked near the mouth of Platte Creek in the Fort Randall Reservoir area. The first work of the season was in site 39CH7, briefly investigated in the fall of 1947. This fortified site contains round earth-lodges and has yielded a very small amount of trade material. A small party under Cumming's general direction made an intensive survey in various parts of the reservoir area. Another Smithsonian party supervised by Carl Miller resumed examination of historic sites in the Fort Randall Reservoir area which Thomas R. Garth began last year. The locations to be investigated include early military posts, trading posts, and Indian agencies.

Wesley Hurt, of the University of South Dakota, led a party in the excavation of a stratified site on Scalp Creek in the Fort Randall Reservoir, and of a single-component site on Ellis Creek. Hurt's report on the Swanson site, 39 Br 16, has just been issued by the State Archaeological Commission of South Dakota.

The Nebraska State Historical Society field party, under the direction of Marvin Kivett, also worked in South Dakota in the Fort Randall Reservoir area, at an earth-lodge village site, near Oacoma. The contents of two or more houses and a small burial pit suggest a culture related to Lower Loup and the Talking Crow site. The field party of the Museum of Natural History, University of Kansas, headed by Carlyle Smith, returned to the Talking Crow site and continued the excavations.

The Nebraska State Museum had a party under the direction of E. Mott Davis in the Medicine Creek Reservoir area, where some deeply buried sites of early man, required further investigation. The Laboratory of Anthropology of the University of Nebraska returned to the Harlan County Reservoir for continued work.

Much interesting information on the widespread and varied activity in the Missouri River drainage, including occasional items about bobcats and potato cellars, is to be found in the *MRB News*, mimeographed and distributed by the River Basin Surveys (Smithsonian Institution), at the University of Nebraska, Lincoln, Nebraska. The June 1951 issue of the Plains Archaeological Conference *News Letter* is largely devoted to "New Notes on the Dakota earth lodge" by James S. Howard.

NORTHERN MISSISSIPPI VALLEY

Missouri. A survey of archaeological sites and collections in southeastern Missouri is being made by Stephen Williams and Edwin G. Scully as part of the research program of the Museum of Anthropology of the University of Michigan in the central Mississippi valley.

The Ozarks chapter of the Missouri Archaeological Society at Springfield, Missouri, has organized a Committee on the Pomme de Terre Basin to cooperate with the Missouri Archaeological Society, the University of Missouri, the National Park Service, and the Corps of Engineers in salvaging the archaeological resources of the area along the Pomme de Terre River in Hickory and Polk Counties, Missouri, which will be flooded by the proposed Hermitage Reservoir, a link in the Missouri River Development Program. The committee, already actively engaged in surveys along the reservoir area, will coordinate archaeological investigations and will re-survey known sites to obtain representative collections of surface material. All information the committee obtains will be made available to the University of Missouri and to the Missouri Archaeological Society for the planning of future excavations on the key sites. The committee intends to prepare a comprehensive report on the historical, geological, and archaeological resources of the Pomme de Terre Basin, which it will submit to the Missouri Archaeological Society for publication in the *Missouri Archaeologist* or as a *Memoir*. It is estimated that at least two years will be required for the survey of all Indian occupation sites in the reservoir area.

Iowa. The Iowa Archaeological Society was organized in May 1951 at McGregor, Iowa. It will issue a quarterly journal and a monthly newsletter, and will build up a file of standard archaeological survey forms on sites and remains throughout the state. Memberships and further information may be obtained from the secretary-treasurer, Wilfred D. Logan, of the National Park Service, at Effigy Mounds National Monument, McGregor, Iowa.

Illinois. The Illinois State Museum and the University of Chicago in a joint field party are excavating the Hubele village site in White County, Illinois. It is presumed that the villagers built the Ethel R. Wilson mounds and buried less important members of the community in the ridge nearby.

The report by Georg K. Neumann and Marvin B. Fowler on the 1950 season of field work of the Illinois State Museum at the Wilson site, and reports on other sites in Illinois by Winslow Walker, John McGregor, and Marvin B. Fowler, are in press; they will appear early this autumn under the title "Hopewellian Communities in Illinois." Thorne Deuel is editor. The volume will contain the classification of the Hopewellian pottery proposed by James B. Griffin and accepted at the conference held in Springfield in 1951.

The Museum of Southern Illinois University has under way the excavation of a large rock shelter known as Peters cave, on Kincaid Creek west of Murphysboro, Illinois. Work directed by J. Charles Kelley, was begun in the spring of 1951. The midden, toward the back wall of the shelter, was somewhat more than a meter in depth, with pottery and other artifacts of mixed Woodland and Mississippian affiliations, probably having some stratification in about the upper half of the deposit. Pottery and other artifacts are present in quantity in the upper part of the midden deposits, but are meagerly represented in the deeper lower levels. Since the summer's work will hardly have touched the deposits in the shelter, the Museum hopes to return in subsequent field sessions.

Wisconsin. The Wisconsin Archaeological Survey conducted its third season at the site of Aztalan, with Robert Maher, of the University of Wisconsin, in charge of the crew. The work initiated the reconstruction phase of the program, the objective being to rebuild the pyramidal mound in the southwest corner of the stockade. Although the mound had been previously explored by S. A. Barrett, trenches have revealed an additional structure on the top of the mound associated with an earlier building phase.

NORTHEAST

A considerable amount of archaeological field work was carried out in various parts of the northeast during the summer and fall of 1951. Theodore L. Stoddard, Jr., continued his work in the general Passamaquoddy-Cobscook Bay region, and Howard Sargent conducted a survey in New Hampshire, both under the auspices of the Robert S. Peabody Foundation for Archaeology at Andover. Elmer Harp, Jr., continued his reconnaissance of the Connecticut Valley just north of Hanover, N. H., for the Dartmouth College Museum.

In Ontario, Canada, the Royal Ontario Museum of Archaeology excavated an early Point Peninsula site at Lake Scugog, under the supervision of Kenneth E. Kidd. Moderate amounts of pottery, together with bone and shell were found, but no burials were reported. E. F. Greenman of the Museum of Anthropology, University of Michigan, continued his excavations in the vicinity of Killarney, Ontario, assisted by five students in the University's summer field session in archaeology.

Three institutions in the State of New York were active. According to Alfred K. Guthe, the Rochester Museum of Arts and Sciences carried out the partial excavation of a site near Westfield, New York. During a period of one month a small party excavated nine pits. Although the refuse material in the pits was scanty, sufficient pottery was found to indicate two or more different occupations over a period of time. Roughly, the material would be classified within the late Woodland period.

The State Science Service and State Museum excavated on sites in central, northern and eastern New York between June 18 and the end of September. A productive stratified site with Owasco material overlying late Point Peninsula was dug on the Seneca River. An Archaic period early Laurentian culture site was excavated on the upper Hudson River near Schuylerville, while near Catskill in the same valley a later Laurentian site was explored. On the Indian River, Jefferson County, early Point Peninsula crematories, the first of their kind on record, and burials in red paint were investigated.

The Buffalo Museum of Science this year instituted a limited program of field work in western New York. Miss Marion E. White was in charge of excavations on a late prehistoric and probably protohistoric Iroquois station near Buffalo.

William J. Mayer-Oakes, heading the extensive survey of the Carnegie Museum of Pittsburgh, reports reconnaissance and excavations in several areas from May through September. Several mounds have been located, and collections suggesting Hopewellian and Middlesex-Adena influences have been examined, but late period sites were rare. Mayer-Oakes has been working with the West Virginia Archaeological Society on the designing and installation of exhibits in the new Grave Creek Mound Museum at Moundsville, W. Va., which will probably be open early in 1952.

SOUTHEAST

The Southeastern Archeological Conference will meet at the University of Florida, Gainesville, November 2 and 3. Contact John M. Goggin, chairman, for reservations and further information.

River Basin Surveys activity has come to a halt in the Southeast because no appropriation has so far been made by Congress for the current fiscal year.

The Cherokee Institute (Tsali Institute for Cherokee Studies) has been recently organized. Discussions between T. M. N. Lewis and Joe Jennings, Superintendent of the Cherokee Reservation, at Knoxville, determined that the guidance Jennings needed in reconstructing a late 17th or early 18th century Cherokee village could best be supplied by a combined effort of the universities in the Cherokee area. It was finally decided to formally establish an institute, legally incorporated, to do the work. The board of directors includes two members from each of the universities of Georgia, North Carolina and Tennessee, the superintendent of the Cherokee Indian Agency, the president of the Cherokee Historical Association, and the chief of the Eastern Bank of Cherokee.

The first task of the Cherokee Institute will be the reconstruction of the 1750 village, using $25,000 made available by the state of North Carolina on a loan basis. General agreement has been reached on a site and type of buildings. It will be a tourist project with Indians living in the houses during visiting hours. Basic ethnohistorical source will be the W.P.A. files made up at the University of Tennessee, with Madeline Kneberg furnishing the data. The second program will be digging several 18th century villages to get details, artifacts, etc. A. R. Kelly and Joffre Coe plan the investigation of two documented sites in Georgia and North Carolina.

Virginia. Carl Miller carried on excavation in nine sites at Buggs Island Reservoir on the Roanoke River from the first of March until June 22. The two sites which it was hoped would give information on the so-called Eastern Variant of the Folsom Complex did not pan out. At both locations it was found that nothing remained *in situ*. All of the material picked up from the surface was flotsam which had been left when the site itself was eroded away.

Kentucky. The University of Kentucky is currently working on an Adena mound near Maysville on the Ohio River. Excavations under the supervision of Raymond Wilkie, a Yale graduate student, have yielded a few poorly preserved burials with little other grave goods than copper bracelets. Refuse accumulations with sherds are an unusual feature.

Webb and Woodbury are currently studying materials from the Jonathan Creek site, a large, late prehistoric, stockaded village site.

During the month of April, Douglas W. Schwartz made a survey of the proposed Celina Reservoir area on the Cumberland River in southern Kentucky. Schwartz found 24 sites the majority of which were those of villages. The area apparently was rather extensively occupied. The project is a cooperative one of the University of Kentucky and River Basin Surveys, under the general direction of Webb.

South Carolina. Joe Caldwell, of the River Basin Surveys, made a hurried inspection of the remains of Fort Charlotte, for the purpose of making recommendations as to what might be done to save information which will be lost there when the Clark Hill Reservoir is flooded.

Georgia. The University of Georgia summer field school under direction of A. R. Kelly, is working on 9Ba150, large late Kellogg and early Cartersville period village site on Pine Log Creek. Results are rounding out the picture on those cultures.

Prospective cave exploration promises, on the basis of preliminary data, a north Georgia cave tomb burial focus whose traits show a generalized Copena relationship, and which will fit somewhere in the Cartersville period horizon. All that can be said about Cartersville at present is that it is a presumptively long "transitional" period, ensuing after the relatively pure Kellogg (fabric impressed or cord-wrapped stick) horizon, marked by continuation of Kellogg pottery plus appearance of several stamps, simple check, and some complicated.

William Sears is working at Kolomoki State Park, assisted by Lewis Larson. The latter is excavating one of the smaller mounds, mound H. Sears has resumed work in mound D which produced rather elaborate effigy pottery last year, including rattlesnake, adornos, bird and animal effigies in the round, and two human figures. Since stripping off the last mantle, there has been found all sorts of cremated and uncremated single skulls and bundles of long bones, plus the charcoal from the cremations, all this right on top of the next to last cap. Copper ear ornaments, cymbal type, with several skulls, large sheet mica ornaments, simple strips, and an iron cymbal shaped ear ornament, which presumably is of meteoric origin, are included.

John M. Goggin, University of Florida, surveyed a number of coastal sites in Georgia early in the summer in order to get some idea of the Spanish missions and earlier sites for a better understanding of North Florida material.

Florida. During the spring of 1951 Ripley P. Bullen of the Florida Park Service investigated a burial mound at Homosassa which had been badly damaged in construction operations. He also made a surface collection and dug two stratigraphic tests at the famous Crystal River site.

The Florida State University, under Hale G. Smith, has excavated a late Swift Creek—early Weeden Island burial mound in Jefferson County. Surveys of the Ochlockonee Bay area, Wacissa River area (from boil to confluence with Aucilla), and various keys of Dixie County have been completed.

Various large and important sites in Leon, Wakulla and Franklin counties where muck deposits were present have been tested. The muck tests were made in hopes of obtaining organic specimens. This project proved unsuccessful. However, several aboriginal wells were found in coastal sites.

At the present time excavations are being made at a Spanish mission known as Pine Tuft. This lies three miles west of the Scott Miller site excavated by Smith in 1947. When Pine Tuft burned corn, peas, beans, barley (?) or wheat (?) acorns, and pumpkin seeds were charred and preserved. Quantities of glass beads, Indian pottery, Mexican majolica and Spanish earthenware have also been found.

Mr. Lothar Witteborg, formerly graduate student in Anthropology at the University of Michigan, has been appointed curator of the Florida State University Museum.

William Edwards, a Columbia graduate student, is working on the general problem of preceramic and other early cultures in the state. He is following out last year's work in Brevard County which yielded a preceramic horizon, with Suwannee points, underlying a level with fiber-tempered pottery.

The University of Florida has continued its survey and testing program in the northern part of the state. Further excavations at Fort Pupa on the St. Johns River, yielded a sequence of early Orange material below St. Augustine. Remains from the 1740 occupation by the British were at the top.

The summer field school has been excavating a pre-Cades Pond period village, the Melton site, near Gainsville. Pottery is very abundant along with much bone and flint work. Decorated sherds were very rare, Deptford Simple Stamped and Swift Creek Complicated Stamped being found.

Mississippi. William Haag is finishing the survey of the Grenada Reservoir on the Yalobusha River. In this area there has been found representation of early ceramic horizons, burial mounds, and truncated pyramidal mounds. It is planned that a selective program of excavation will give a fairly comprehensive picture of the prehistory of what appears to be a transitional area. The survey has been a joint endeavor of the National Park Service and the University of Mississippi.

A joint American Museum-Harvard University party headed by James A. Ford and Philip Phillips dug at the Jaketown site, near Belzoni, Mississippi from mid-March until the end of May. Directly upon an old natural levee, about 3500 years ago, there was laid down about a three-foot deposit of a nonceramic group like the Poverty Point culture. Overlying this midden is a sterile zone which is itself overlain by a pottery bearing accumulation of varying thickness. The pottery includes Tchefuncte, Marksville, Baytown and other early wares ranging into Mississippi shell-tempered types. On the site or a part of the site is a group of large truncated pyramidal mounds, the beginnings of which seem to stem from Tchefuncte times.

Louisiana. Clarence Webb and Robert Fulton are continuing their study of a solitary hill top mound at Bellevue. A small premound circle of post molds, 10 feet in diameter, enclosed an irregular depression containing an ash bed. The very small percentage of decorated sherds include apparent Marksville types.

Arkansas. The field school of the University of Arkansas under Lynn B. Howard excavated in a large village site, associated with two large mounds, near Chidester, Arkansas.

Oklahoma. In eastern Oklahoma during April and May, D. J. Lehmer of the River Basin Surveys carried on excavations in the area to be flooded by the Tenkiller Ferry Reservoir on the Illinois River. At the Cookson site (34Ck12), he uncovered 6 houses, 4 graves, 2 hearths, and 31 cache pits. The site apparently contained two horizons. The first seems to have been characterized by a rectangular structure similar to that considered typical of the early Spiro component while the late horizon was characterized by rectangular houses which are generally similar to the late Spiro component. On the basis of the artifactual material, it seems that the late horizon, in the terms of Krieger's analysis of the total situation of the area, probably is a previously unrecognized focus of the Fulton Aspect. The earlier horizon may well prove to be a pre-Gibson Aspect when viewed in the same light.

The field school of the University of Oklahoma, directed by R. E. Bell, also dug in the Tenkiller Ferry area this summer, concentrating on the Vanderpool site, Ck 32, and working also at the Morris site, Ck 39, which was found and tested in May by Lehmer. Three components seem to be indicated at the Vanderpool site—preceramic ("Archaic"?), clay-tempered pottery ("pre-Gibson"?), shell-tempered ware (Fulton aspect), but the projectile points appear generally similar throughout, large and rather crude stemmed, with small points very scarce even in Fulton (shell temper) associations. A series of rather well-preserved flexed burials, with a late cultural complex of Fulton aspect affiliation, was found at Ck 39.

In early August, Bell initiated a University of Oklahoma excavation job, under contract with the National Park Service (concluded before June 30, utilizing funds from last fiscal year) in the Eufaula Reservoir project area, on the South Canadian River in eastern Oklahoma.

East Texas. The entire program of the Smithsonian Institution throughout Texas has come to a halt, at least temporarily, and the Austin field office of the River Basin Surveys was closed down as of June 30.

SOUTH AND CENTRAL AMERICA

General. The attention of our readers is called to the important summaries of South American archaeological activities appearing in the *Boletín Bibliográfico de Antropología Americana*, published annually by the Instituto Panamericano de Geografía e Historia in Mexico. The current issue, Vol. XIII (for 1950), contains reports from nearly all South American countries, which in large part supplement rather than duplicate the coverage of this department.

Colombia. The Instituto Etnologico Nacional has been excavating a Chibcha site on the Hacienda Mondonedo, Municipio de Mosquera, Cundinamarca, and early information on the work has been received from the director, Luis Duque Gomez, and from Ruben A. Stirton of the University of California who was doing paleontological work in the vicinity. Part of the site is a mound on top of which are postholes outlining what was apparently a ceremonial structure of wood such as is described for the Chibcha of the conquest period. Refuse nearby contains abundant pottery and animal bones and some beads and stone axes. Guinea pig bones occur in quantity and some fragments tentatively identified as cow suggest a contact period date. A color difference in the refuse suggests the possibility of stratigraphy, but the lower level has not yet been tested. The refuse layers overlie Pleistocene deposits which have yielded abundant fossil animal bones at no great distance from the site, but nothing suggesting an association of human occupancy with the Pleistocene fauna has been reported.

Peru. The January, 1951 issue of *American Antiquity* carried a note about the excavations by Ross T. Christensen at the habitation site of Chusis, near Sechura in the Piura valley of northern Peru. A preliminary report of this site is to be published by Brigham Young University. The Chusis site is remarkable in that it appears to have been the home of a community which was unusually resistive to outside influences over a considerable period of occupation. The pottery shows no direct influences of either Moche or Chimu styles, although both are found elsewhere in the same valley. Inca influence is also absent. The community seems to have based its subsistence on farming and fishing; weaving, copper metallurgy and domestic animals are found throughout the period of occupation. The architecture is not elaborate and burials are also simple. The site appears to represent a simple sort of village community, probably fairly common in ancient Peru but generally neglected up to now by archaeologists because of the abundance of elaborate ceremonial centers.

In addition to the Chusis excavation, Christensen's project included visits to a number of sites in the same general area. Chulliyachi, a group of five large refuse mounds, is believed locally to represent the original site of Sechura, abandoned several centuries ago after the destruction of the settlement by a tidal wave. On the Illescas peninsula, two quite different cultures were distinguished. One is characterized by individual flexed burials, skillfully carved stone bowls placed over the faces of the dead, bone awls, shell beads, and complete absence of pottery. The other shows, in contrast, mass burials in caves, beautifully woven and dyed cloth and fish nets, stone houses, and pottery showing Chimu influence. Christensen suggests that the non-ceramic culture is almost certainly the older and thinks it not impossible that it may compare in antiquity with Huaca Prieta in Chicama.

The modern pottery making center of the Piura valley is the town of Simbalá, where Christensen found a flourishing tradition of handmade pottery undoubtedly connected historically with the prehistoric pottery industry of the area.

A newspaper article has appeared in *El Comercio* of Lima, where so much Peruvian archaeological work is first reported, describing a project undertaken by one of Richard P. Schaedel's students at the University at Trujillo. The student, Emilio Gonzalez Garcia, has been making a detailed architectural study of a single compound of the ruins of Chanchan, that is called the Cabildo or Laberinto. An article by Schaedel in the August *Scientific American* describes archaeological site survey findings in Peru.

Guatemala. At the end of July, the Museo Nacional de Arqueologia y Etnologia de Guatemala and the Instituto de Antropologia e Historia announced the formal inauguration of its sherd laboratory. Work on the classification and organization of the study collections made by the National Museum and those donated by the Carnegie Institution, the Philadelphia Museum and private individuals has been under way for the past two years under the direction of Stephen F. de Borhegyi. In addition to the plans outlined in the Notes and News section of *American Antiquity*, 1950, Vol. 15, No. 4, p. 357, a detailed bilingual filing system has been set up both for the National Museum in Guatemala City and for the municipal museum in Chichicastenango. The material, consisting of over a million selected representative sherds and approximately six thousand whole specimens, is now arranged according to geographical location and cultural horizon. Colored tags on the drawers and stands serve to locate the material in the cultural and time horizons developed by the Carnegie Institution of Washington—Pre-Classic (early and late), Classic (early and late) and Post-Classic (early and late). A catalog of special wares, shapes and design techniques will be published sometime next year in a special number of the museum *Revista* (IDAEH), Borhegyi adds. Included in this will be a review of museum techniques and the use of a sherd laboratory as well as distributional maps, chronological and comparative charts, and a brief survey and historical reconstruction of the southern Maya area.

We also learn with pleasure that Richard Woodbury's report on the Zaculeu excavations in Guatemala is in galley proof and should be ready for distribution by the United Fruit Company (Pier 3, North River, New York City) by the end of the year.

NOTICE OF AAAS MEETINGS

Meetings of Section H (Anthropology) will be held December 27-30, 1951, in Philadelphia. Other related sections of the American Association for the Advancement of Science, such as biology and psychology, are meeting in the same city, December 26-31.

Joint symposia on subjects of common interest will be held by Section H with the Biometrics Society, the American Sociological Society, the Eastern Division of the American Philosophical Association, the Society for American Archaeology, the Society for Research in Child Development, etc. General papers will be accepted, by title accompanied by abstracts, up to September 28. Symposia will cover topics of general interest such as *Cultural Relativism* in which Richard Brandt will act as chairman, and Ralph Linton, Clyde Klukhohn and Philip Blair Rice as participants, and area coverage of symposia will concentrate upon Africa and Asia.

Headquarters hotel for AAAS and for Section H will be the Bellevue-Stratford. Reservations for that and other down-town hotels should be made well in advance through the Housing Bureau for AAAS, Architects Building, Philadelphia 3, Pa. Rates run from $4.50 single, $7.00 double, up. Advance registration, which assures receipt of the total printed program well before the date of the meetings, is $2.25 for AAAS members and $3.25 for non-members, and may be made through the Administrative Offices, 1515 Massachusetts Ave., N.W., Washington 5, D.C. The meetings are open to the public but audience and program participants are urged to register either in advance or at the meetings ($2.00, and $3.00 for non-members of AAAS).

Inquiries regarding Section H meetings may be made to the Secretary: Marian W. Smith, 501 West 113 St., New York 25, N.Y.

GLENN A. BLACK

Wabash College conferred an honorary degree upon Glenn A. Black, recently retired Treasurer of the Society for American Archaeology. He received the degree of Doctor of Science (Sc.D.) at the Commencement exercises on June 3.

1951 Annual Meeting
Southeastern Archaeological Conference
University of Florida, Gainesville
November 2 and 3

International Congress of Anthropological and Ethnological Sciences

At the third session of the Congress, held in Brusse in August 1948, it was decided that the next Congre should be held in Vienna. Accordingly, the 4th Co gress will assemble there from September 1st to 8t 1952.

The Austrian Government and the scientific institu tions and societies in Vienna have guaranteed full su port and collaboration.

The membership fee is Austrian schillings 200.— ($8.00. It covers various scientific tours and social fun tions. All members will receive a copy of the Proceed ings. A member may register up to 2 members of h family as associates. The fee for Associate membersh will be Austrian schillings 100.— or $4.00. They ma attend the meetings, excursions and receptions, but ma not speak or vote, and they will not receive the Pr ceedings.

Members who intend to submit papers may from no on send in the titles to the Secretary. Except in speci cases, the time allotted to every paper will be twen minutes, plus another ten minutes for discussion. Me bers should inform us whether they will require a pr jector and indicate the size of their slides or films.

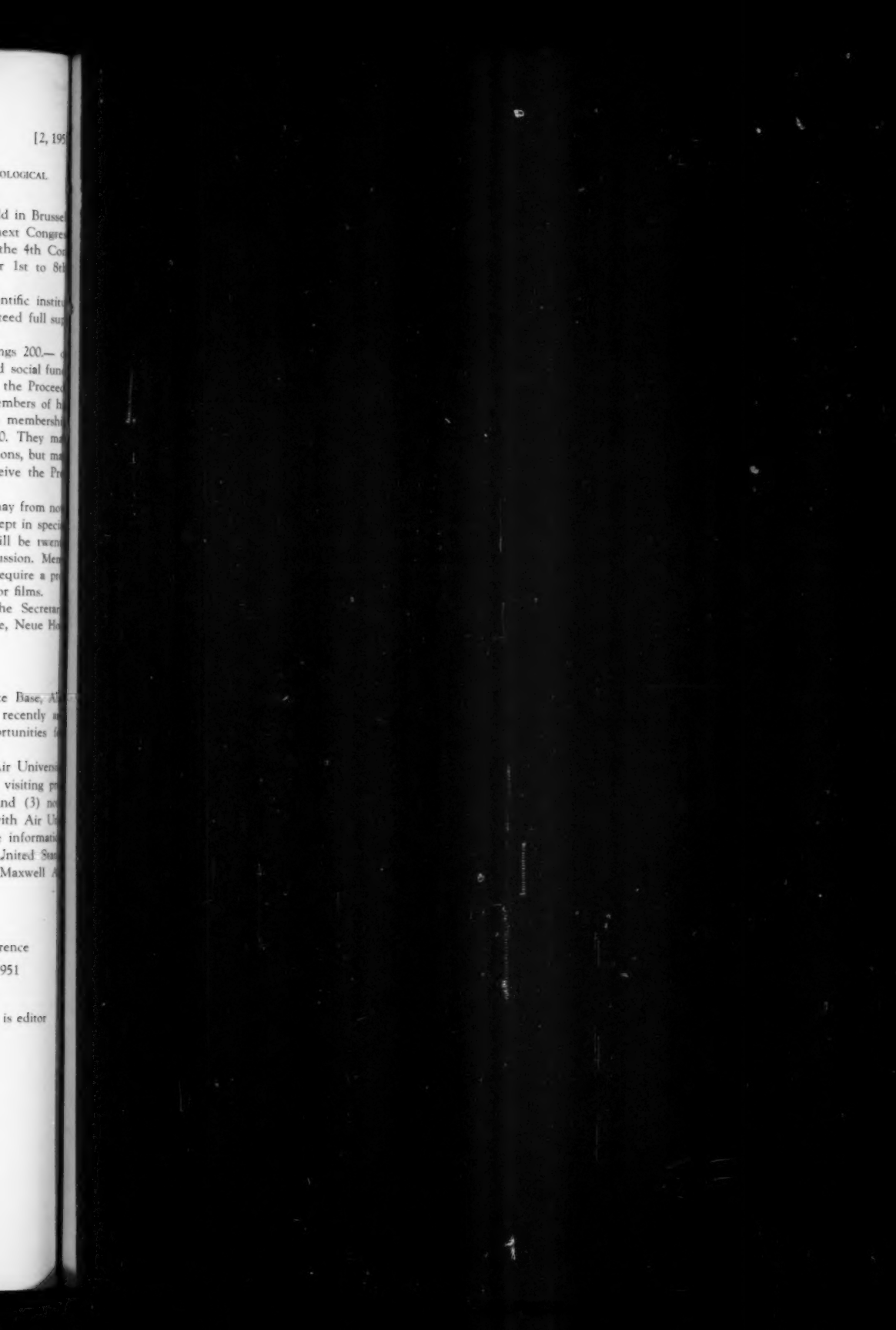
Please address all correspondence to the Secreta Wilhelm Koppers, Institut für Völkerkunde, Neue H burg, Corps de Logis, Vienna I., Austria.

NOTE

The Air University, Maxwell Air Force Base, Al bama and Randolph Field, Texas, has recently a nounced a program of off-campus opportunities f graduate and professional education.

Three types of awards are given: (1) Air Univers fellowships for pre-doctoral research, (2) visiting pr fessorships in a wide variety of fields, and (3) no compensation awards involving research with Air U versity facilities. Those interested in more informati should write the Director of Education, United Sta Air Force Headquarters, Air University, Maxwell A Force Base, Alabama.

Southeastern Archaeological Conference
Newsletter, Vol. 3, No. 1, Oct. 1951
is out and just received
William Haag, University, Mississippi, is editor



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1938. "The Sauk Valley Skeleton." *Bulletin of the Texas Archaeological and Paleontological Society*, Vol. 10, pp. 136–68. Abilene.

Citations from separate books or pamphlets:

JENKS, ALBERT E.
1936. *Pleistocene Man in Minnesota.* Minneapolis: University of Minnesota Press.

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